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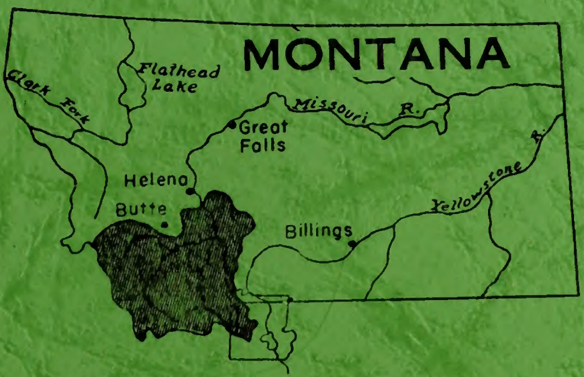
OF THE

PUBLIC DOMAIN LANDS

IN THE

UPPER MISSOURI RIVER BASIN



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A MISSOURI RIVER BASIN INVESTIGATION

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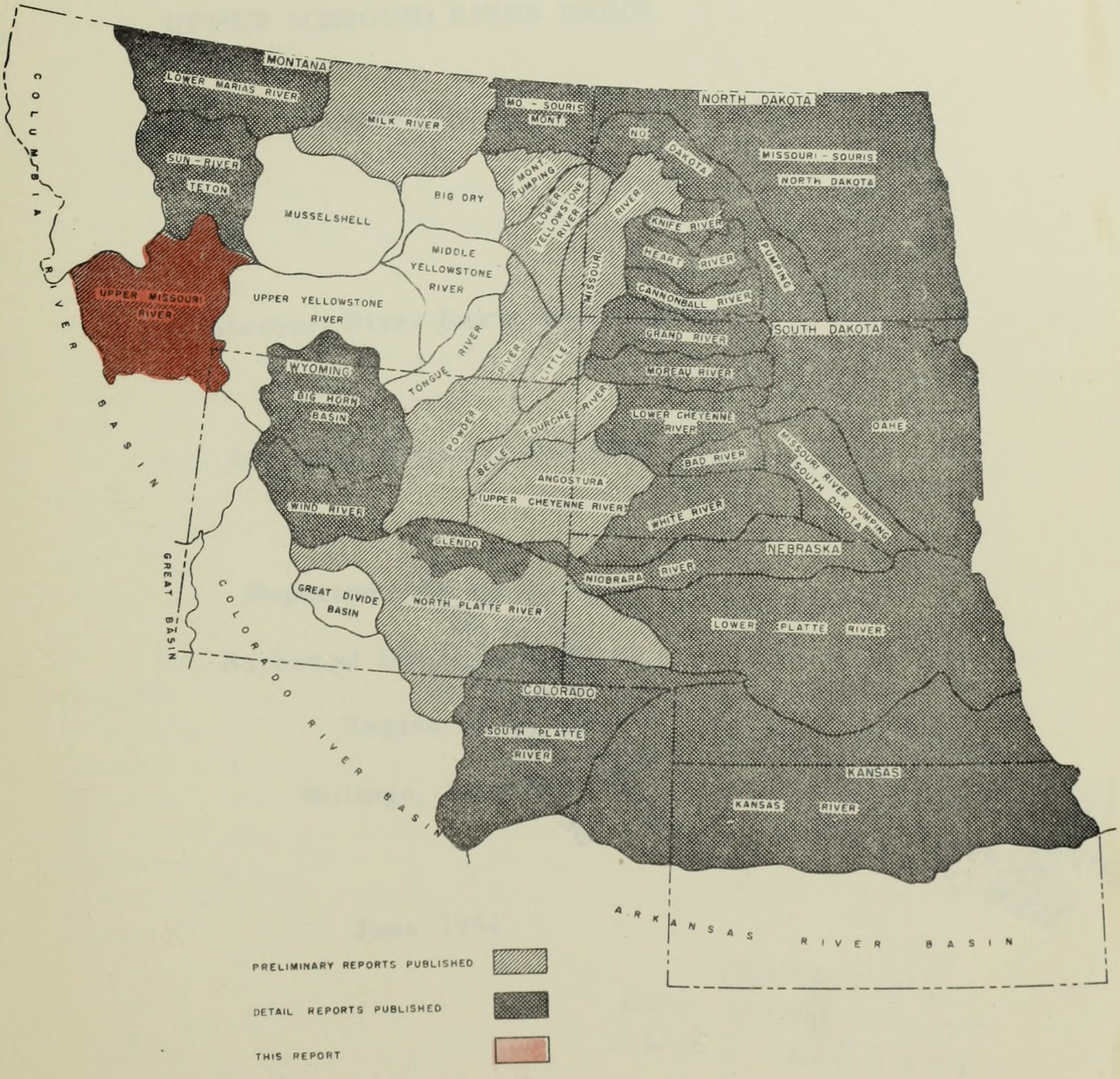
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
REGION III
BILLINGS, MONTANA
JUNE 1954

PRESENT STATUS OF BUREAU OF LAND MANAGEMENT STUDIES IN THE MISSOURI RIVER BASIN

(LAND CLASSIFICATION)



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Land Planning and Classification Report
# of the
Public Domain Lands
in the

UPPER MISSOURI RIVER BASIN

MONTANA

(A Missouri River Basin Investigation)

For Administrative Use Only

Department of the Interior

U.S. Bureau of Land Management

Region III

Billings, Montana

June 1954

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This report was compiled as a feature of the program of the Department of the Interior for the development of the resources of the Missouri River Basin.

TRANSMITTAL AND ACKNOWLEDGEMENT

The Upper Missouri River Basin presents a challenge to all agencies for the conservation and orderly utilization of the water, soil, forage, timber and other resources. The effectiveness of a watershed management program to properly utilize these resources is dependent on proper use and management, which should be the goal of all concerned.

This report has been prepared to provide the Bureau of Land Management with data necessary for the proper conservation and most productive utilization of the public domain lands and resources, and recommendations for the management or disposal of these lands.

The data presented in this report are based primarily upon field examination of public domain administered by the Bureau of Land Management and such adjoining patent and State land that form a part of the natural management units. The different government agencies concerned with the development and administration of resources of the Upper Missouri River Basin have contributed information. State and local government agencies, and local livestock operators and corporations within the basin have contributed time and information.

The field studies, the assembling and analysis of important factual data and the preparation of the report were conducted by Dale J. Buxton, with the assistance of Cecil L. Hase, both Range Conservationists. Maps were prepared under the supervision of William C. Anderson, Engineering Draftsman. The entire study was under the direction of Robert D. Nielson, Regional Chief of the Division of Lands. Valued assistance has been given by Fred Benson, District Manager, Montana 5, and by the members of his staff.

W. B. Wallace

Area Administrator

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INTRODUCTION

The Upper Missouri River Basin is an important segment of the Missouri River Basin, as considered in the comprehensive plan for the full development, conservation, control and use of the land and water resources of the Missouri River drainage. This basin covers the area in Montana and Wyoming embraced within the headwaters of the Missouri River tributary to Canyon Ferry Dam, which is located on the Missouri River near Helena, Montana. It is the purpose of this study to inventory the lands and resources administered by the Bureau of Land Management within this basin and those of adjacent associated private and State lands. Problems and management of these lands and their resources are considered. This work was accomplished by detailed field examination of the land and its resources within the area.

The results of the resource inventory and study are presented herewith in narrative form. Detailed studies by area classification, were limited to the Jefferson and Townsend basins because of the concentration of public domain lands and the problems existing in this portion. This portion of the basin includes all the drainage above Whitehall, Montana, and the drainage between Whitehall, Montana, and Canyon Ferry Dam on the west side of the Missouri and Jefferson Rivers, except the Big Hole drainage above Ralston, Montana. The remainder of the area contains relatively little public domain and, therefore, only the public lands were classified.

Each isolated tract of public domain was examined in detail, classified and appraised. A classification report, complete with map and all pertinent details of vegetation and soil characteristics and condition, and management recommendation, was prepared for each tract. These reports are on file in the Montana State Office of the Bureau of Land Management, Billings, Montana.

The preliminary report of the Upper Missouri River Basin was published by this Bureau in April, 1952, and it should be used in conjunction with this report. Included therein is a colored map of the entire basin area, showing land ownership, land management areas, and culture, giving an over-all detailed picture of county, city and road locations, as well as natural features. The preliminary report also presents a general description of the physical and economic conditions and land management problems. Associated reports prepared by this Bureau for the Missouri River above Fort Peck Dam cover the Sun River-Teton Area, Montana, dated March 1953; Marias River Area, Montana, dated March 1953;

and the preliminary Milk River Area, Montana, dated June 1953.

Included with this detailed report is a land classification map showing land resources printed over a base showing land ownership and culture. All data on land capability and condition, vegetation types, erosion and proposed improvements are shown on this map. Range type is the basic feature delineated on the map and is designated by appropriate symbols. The resource inventory information is shown by proper symbols in fractional form within each range type. When there is a change of land capability, range type, erosion, or any other change of inventory information it is shown by a solid green line and another fractional formula.

The problems outlined in the preliminary report have been considered in this study. These problems were investigated and solutions are proposed to bring about better management and improvement of the lands and resources of the basin.

Present land use has been determined and proposals have been made for adjustments and changes in use where appropriate. Multiple-use problems of the public domain have been considered as well as land tenure problems and solutions are proposed.

Proper range use by season and degree of utilization is of vital interest and responsibility of each and every ranch operator, land owner, and management and development agency in the Upper Missouri River Basin. A good percentage of the land of this Basin is useful as rangeland so its proper use and management has a most important influence over the economy of the area. The effectiveness of a watershed and range rehabilitation program is dependent on proper use and management, which should be the goal of all concerned.

GENERAL DESCRIPTION

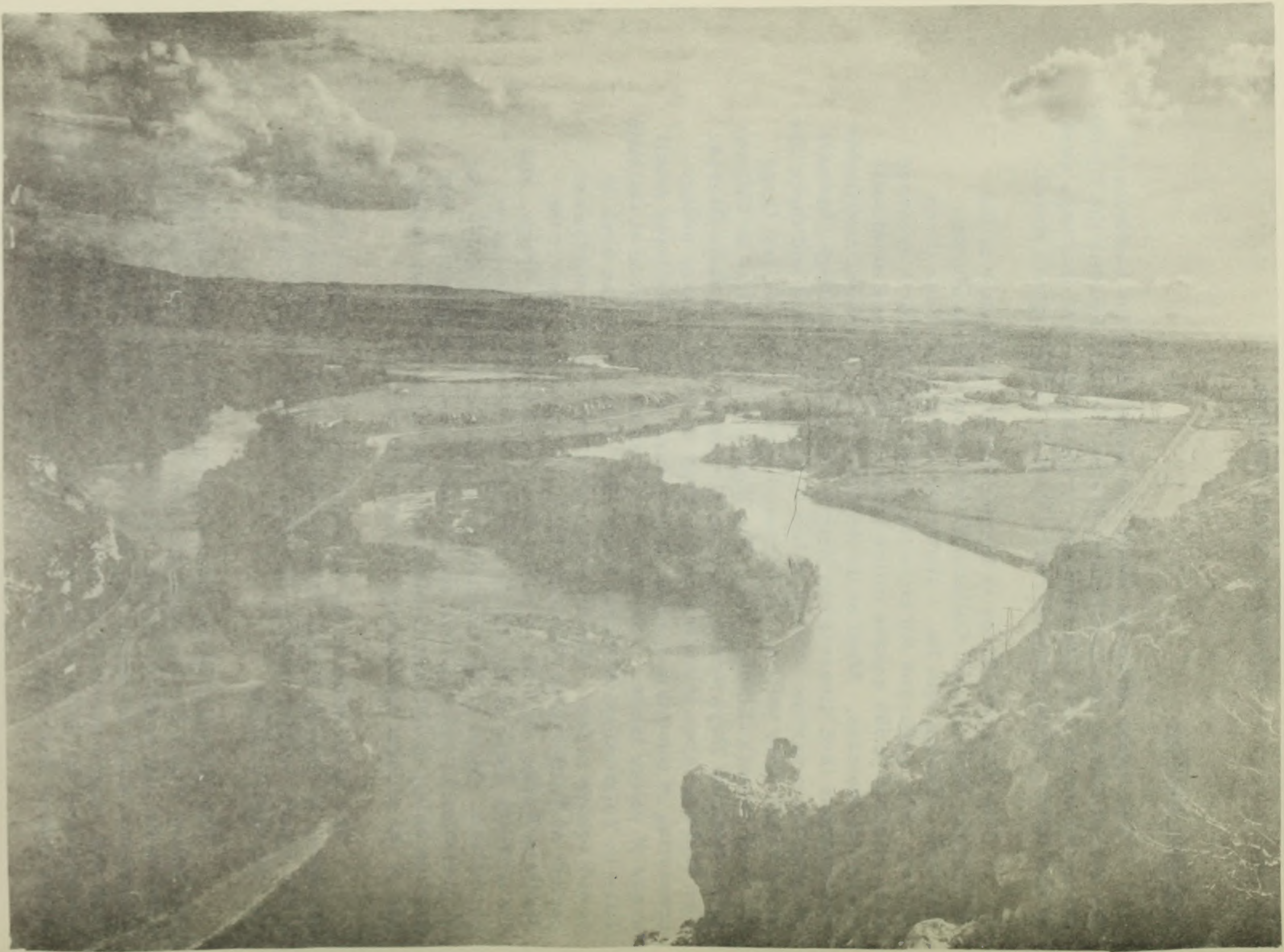
Location and Size

The Upper Missouri Basin lies adjacent to the backbone of the United States, the Continental Divide. In this locality the Divide forms the south and west boundary of the basin. The drainage area of this basin, above Canyon Ferry Dam is 15,680 square miles.

The Missouri River is formed by the confluence of the Jefferson, Madison and Gallatin Rivers, near Three Forks, Montana. Photograph No. 1 shows the meeting of these three rivers. The Jefferson River is the outlet channel for a drainage area of about 9,580 square miles lying in the extreme southwest corner of Montana. Most of its drainage area is rough, nontillable mountainous land dissected by deeply intrenched drainage channels ranging from narrow valleys to box canyons, but here and there are found broad open valleys and terraced benches that include large areas of smooth tillable land. The Madison River rises in Yellowstone National Park by the junction of Gibbon and Firehole Rivers. The drainage area tributary to the river is 2,560 square miles, consisting of mountain ranges, high plateaus, and relatively small areas of valley lands. The Gallatin River has its source at Gallatin Lake in Yellowstone National Park, the river drains an area of 1,830 square miles. The drainage area includes the northwest corner of Yellowstone National Park, the eastern slope of the Madison Range, and the western slope of the Gallatin Range, and the western slope of the Bridger Range in the Rocky Mountain cordillera. Most of the Gallatin drainage basin above 5,000 feet in elevation is covered with coniferous forest. In general, that portion below 5,000 feet in elevation lies in the Gallatin Valley, one of the richest agricultural areas in Montana.

The main stem of the Missouri River from Three Forks, Montana, to Canyon Ferry Dam drains an area of approximately 1,890 square miles, making the total drainage area for the basin 15,680 square miles.

The Missouri River enters a deep gorge cut into limestone just below Three Forks, Montana, and flows north into the Townsend basin just south of Toston, Montana. This basin is a broad depression about 60 miles long that lies between two moderately high and rugged mountain ranges, known as the Belt Mountains on the east and the Elkhorn Mountain range on the west. The Missouri River leaves this open valley to the north through a deep gorge cut



Photograph No. 1. - The meeting of the three rivers, to form the "Mighty Muddy".

through the Spokane Hills. Canyon Ferry Dam is located in this gorge and the lake formed by this dam will extend 24 miles up the river to near Townsend, Montana. It will have a maximum width of 4.5 miles and cover approximately 35,000 acres.

Climate

The climate varies from semi-arid in the valleys to subhumid in the mountains. Temperatures range from a winter low of less than a minus 50 degrees to a summer high of more than 100 degrees. Summers are short and cool in the mountains and hot in the valleys. The days have long hours of sunshine characteristic of the northern latitudes and great intensity of sunshine incident to high altitudes. Winters are cold but are occasionally moderated for brief periods by warm winds, commonly called "chinooks".

Further information on climatological data in the area is contained in the "Preliminary Land Planning and Classification Report of the Upper Missouri River Basin" by the Bureau of Land Management, dated April 1952.

Geology and Soils

The Upper Missouri Basin is underlain by sedimentary, igneous, and metamorphic rocks ranging in age from pre-Cambrian to Quaternary. Table 1 shows the different geological formations, ages and characteristics of these formations that are found in the basin.

Geology of the basin is a complex of uplifted, folded, and faulted sediments intruded by igneous rocks. Deformation commenced in pre-Cambrian time. Rocky Mountain folding occurred from late Mesozoic to early Tertiary time. Thereafter, extrusion of andesite, thrust faulting, granite intrusion and rhyolite and basalt extrusions followed in order. The impregnations and vein fillings of a variety of metallic and other lode-forming material accompanied and followed the igneous intrusions and was localized by fracturing, resulting from the structural deformation. 1/ The valuable minerals that were formed at this time are important in our economic life today.

The range of mountains constituting the Rocky Mountain

1/ Bureau of Mines, Preliminary Report No. 73, Mineral Resources of the Jefferson Division in Southwestern Montana, September 1952, p. 16.

Table 1.- Geologic Formations in Missouri River Basin
Upper Missouri Basin

System	Series	Formation Name	Character
Quaternary	Recent		Alluvium-sand, gravel, clay
	Pleistocene		Glacial drift and moraines
Tertiary	Pliocene to Oligocene	Lake beds, etc.	Sand, gravel, clay, volcanic ash, conglomerates
Cretaceous	Upper Cretaceous	Colorado	Sandstone, limestone, shale
	Lower Cretaceous	Kootenai	Variegated sandstones and shales, limestone, conglomerate at base
Jurassic		Ellis	Shales, limestone, sandstone
Triassic		Woodside shale	Shales, thin limestones, chocolate brown limestone, sandstone
Carboniferous	Permian	Phosphoria	Cherty limestone and quartzite, black shales, phosphate rock, shale oil (Kerogen)
	Pennsylvanian	Quadrant	Quartzite and zuartzite sandstone, sandstone, impure limestone, shaly in part
	Mississippian	Madison Limestone	Massive bluish gray limestone
Devonian	Upper Devonian	Threeforks shale	Reddish and gray shales, sandstone, limestone, locally carbonaceous and schistose
	Middle & Lower Devonian	Jefferson Limestone	Massive cream to buff limestone, locally black or mud colored beds
Cambrian	Upper Cambrian	Yogo limestone, Dry Creek shale, Pilgrim limestone, Park shale, Meagher limestone	Light gray to bluish gray limestones, thin bedded shales
	Middle Cambrian	Wolsey shale	Gray to green soft shales
		Flathead quartzite	Massive gray to pink quartzite, pebbles in lower beds, weathers to large angular blocks
Algonkian (Pre-Cambrian)	Belt series	Helena limestone	Buff colored shale and limestone
		Empire shale	Siliceous greenish-gray shale
		Spokane shale	Red shale and shaly sandstone
		Greyson shale	Dark gray shale and shaly limestone
		Newland limestone	Dense, dark, thin bedded, impure limestone

front is the western boundary of the basin as well as the Continental Divide. To the east of this main range of mountains lie a number of isolated ranges varying in length from a few miles to many miles, as in the case of the Big Belt Mountains. These may be looked on as outliers of the Rockies, lying out away from the main boundary of ranges. Between these ranges lie lowland belts which may be considered outliers of the Great Plains, in some of which moderately dark colored soils have developed under rainfall somewhat higher than that on the neighboring plains. One such area of considerable size is the Gallatin Valley.

As a general rule the high grassland plateaus within the mountain masses have dark brown soils, and the border belts of the valley basins adjacent to the mountains have similar soils. The interior valley basins, however, are covered as a rule, with brown soils. Some soils of the high plateaus belong with the Chernozems. The soils in most of the valleys south and southwest of Three Forks, Montana, as well as those in the southern part of the Gallatin Valley, are in part dark brown soils and in part Chernozem, the latter occurring only in the upper end, and therefore in the higher parts of these lowlands.

All of these lowland belts are structural, so far as their geological origin is concerned, but the existing soils have developed largely, if not entirely, from material carried into them from the adjacent mountain ranges after they were formed as structural lowlands. The soils have been derived from water laid materials which range widely in character, depending on the character of the material of the adjacent mountain slopes.

Benchlands, occupying lower erosional levels, between the lowlands and the mountains, and probably of the Pleistocene Age, border most of the main streams of the basin. These benchlands have smooth surfaces and are separated by intervening streams, and lie 75 feet or more above the level of the main streams. Their protective covering, which overlies lake bed sediments at varying depths on the lower portion of the tablelands, consists largely of stony and gravelly outwash from the mountains.

The predominating soil within the basin has been developed from stratified, gravelly and sandy material on the secondary benches or terraces. The surface soils of this series are grayish-brown in color. The soils have wide range in texture; but they are of two general types, gravelly loam and stony loam. They are chiefly utilized for grazing land.

Soils of the valleys, as mentioned before, are moderately deep, black, clayey loams and make excellent farm lands. The soils in the rough broken and mountainous land are characterized by brown to gray soils, usually low in organic material, and are untillable because of steepness or stoniness. Most of this land, however, is good grazing or timber land.

Transportation and Roads

Transcontinental routes of the Northern Pacific Railway and the Chicago, Milwaukee, St. Paul and Pacific Railway cross the basin from east to west, and also the Northern Pacific has another route through the basin from Logan to Helena, Montana, by way of the Townsend basin. The existing railroads provide the basin with sufficient and rapid shipment for all types of produces and resources.

The Union Pacific Railroad enters the basin to the south at Monida, Montana, and traverses the basin from south to north and leaves the basin just north of Divide, Montana, and goes to Butte, Montana.

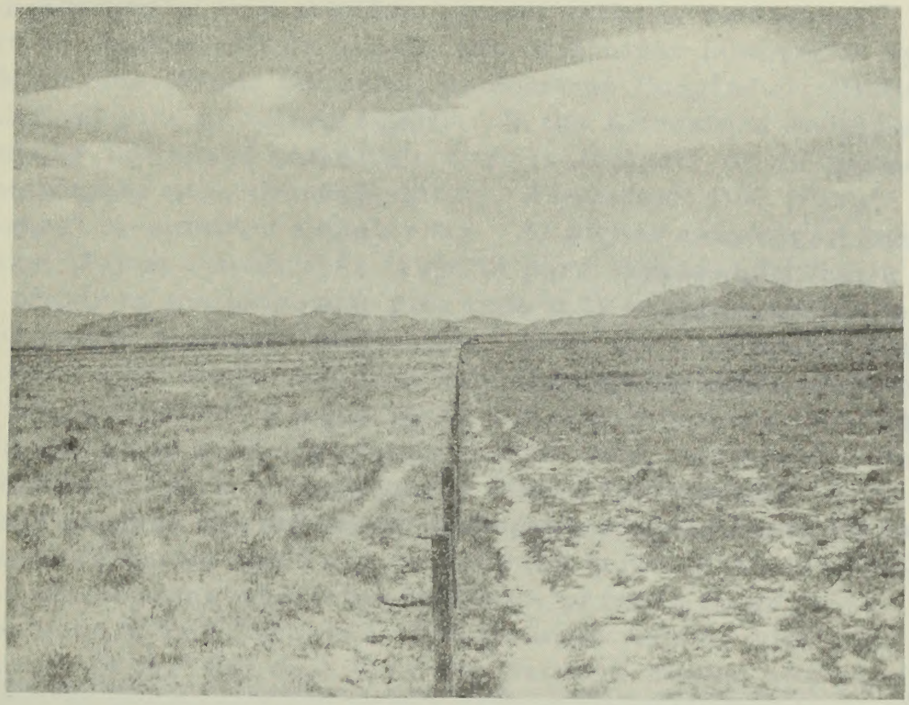
All weather highways, U. S. Nos. 191, 10S, 91 and oiled State highways, Nos. 1, 34, 41, 43, provide excellent highway transportation from this area to the western and eastern markets. Gravelled roads connecting the farm and ranch to these highways and a network of county roads provide excellent ranch-to-market routes. So far as transportation is concerned, the basin is reasonably well situated for marketing its products.

NATURAL RESOURCES

Range Vegetation

The vegetal cover of the basin ranges from the sparsely covered ridges, such as those in the Spokane Hills to lush sub-irrigated natural meadows. The predominate cover type on the benchlands bordering the main streams is a grass land association of blue grama (Bouteloua gracilis), needleandthread grass (Stipa comata), and prairie junegrass (Koeleria cristata).

The low, hilly lands near the creeks constitute a sagebrush - grass association in which the former has become dominant through overgrazing. Because of this overgrazing the sagebrush has invaded adjoining grasslands. Numerous fence line examples, as well as others, emphasize this point as shown in Photograph No. 2. The sagebrush type is composed chiefly of



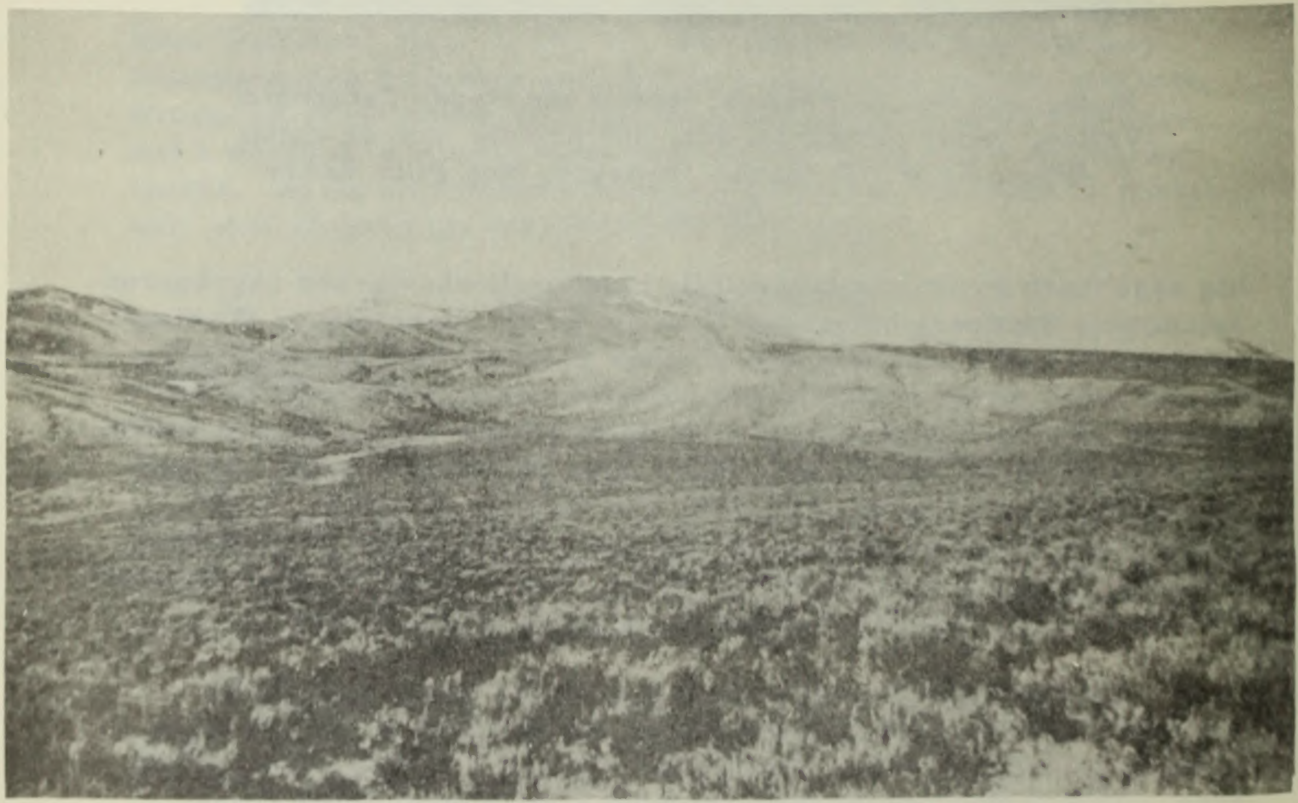
Photograph No. 2 - Federal land in the Upper Centennial Valley, under permit on left, and private land on right. (Photo by W. E. Banko, Manager, Red Rock Lakes Refuge)

big sagebrush (Artmisia tridenata), bluebunch wheatgrass (Agropyron spicatum), Sandberg bluegrass (Poa secunda), Idaho fescue (Festuca idahoensis) and small amounts of other grasses such as needleandthread grass (Stipa comata), and bluestem wheatgrass (Agropyron smithi). Forbs and shrubs such as phlox (Phlox spp.), Broom snakeweed (Gutierrezia sarothrae), Black sage (Artemisia nova), fringed sage (Artemisia frigida), and others in varying amounts. In the lower basin areas bluebunch wheatgrass and bluegrass predominate, while in the upper reaches of the basin, Idaho fescue is more abundant. Photograph No. 3 shows vegetative cover on public domain.

On the foothills below the forest in the upper part of the Jefferson Division where overgrazing has not been so severe as to cause sagebrush invasion, the sagebrush type yields to a pure grass type. This foothill grass type consists of bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass and miscellaneous grasses and forbs. The following tabulation gives grazing capacity, by land-ownership classes, within the study area boundary of the Upper Missouri Basin, 1953.

Status	Grazing Capacity AUM's 1/	Percent of Total Capacity
Public Domain	152,311	26.70
Stock Driveway	13,134	2.30
Powersite	1,828	.30
Public Water Reserve	640	.10
Reservoir Site Withdrawal	681	.10
Reclamation Withdrawal	1,038	.20
Other Federal Land	195	.05
Purchase Reclamation Withdrawal	281	.05
State Lands	90,494	15.90
Private	310,258	54.30
TOTAL	570,868	100.00

1/Compiled from the range survey data of the Bureau of Land Management. 1953.



Photograph No. 3 - Typical public domain range at middle and lower elevations. Note variation in vegetative cover.

Timber and Woodland

Forests of this area are almost entirely coniferous. The pattern in the foothills is usually one of Juniper (Juniperus spp.), whitebark pine (Pinus albicalis) or common Douglas fir (Pseudotsuga taxifolia) in pure or mixed stands. In the Limestone and Spokane hills of the Townsend basin the cover is Juniper, or an open conifer type of Limber pine (Pinus flexilus), Ponderosa pine (Pinus ponderosa) or common Douglas fir. At higher elevations lodgepole pine (Pinus contorta) is found in pure stands. On the lower fringe of the lodgepole pine type it is common to find a narrow belt of common Douglas fir. Near the Continental Divide, which forms the south and west boundary of the basin, and on tops of the other mountain ranges is the sub-alpine non-commercial forest containing such species as limber pine, whitebark pine, spruce (Picea spp.), and alpine fir (Abies lasiocarpa). Intermittent stringers of cottonwood (Populus spp.), willows (Salix spp.) and aspen (Populus spp.) occur along the banks of streams, as well as other areas where the moisture permits these types. The greater part of this timbered, mountainous area is within the boundaries of the National Park and National Forest and administered by the National Park Service and Department of Agriculture.

The timber resources of this basin cover over 3, 836, 000 acres of which approximately 174, 000 acres are on public domain under the administration of the Bureau of Land Management.

Timber reserves total over 46 billion board feet of which 7 billion board feet are merchantable. [2] Under present conditions, the annual cut on a sustained yield basis would be approximately 50 million board feet. Timber reserves of this basin are shown in Tables 2 and 3.

Recreational Resources

The Upper Missouri River Basin contains a wide variety of physiographic features well known for their esthetic qualities. These features include the bluffs along the Missouri River and its main tributaries, the Jefferson, Madison and Gallatin Rivers. It also includes some of the scenic attractions that are of such high order, that they have been set aside as National Parks, Wilderness Areas, and National and State monuments. These areas have been set aside for the enjoyment of both present and future generations.

---

[2] Forest Resources of Central Montana, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana.

Table 2.- Forest Land Area of the Upper Missouri Basin 1/

County	Total Forest Land	Commercial Forest Land		
		Total Acres	Softwood	Hardwood
Beaverhead	1,060,554	862,997	846,470	16,527
Broadwater	187,037	170,777	168,900	1,877
Deer Lodge 2/	129,520	79,373	79,373	- -
Gallatin	753,052	528,651	522,328	6,323
Jefferson	479,818	427,083	422,682	4,401
Madison	605,727	404,695	368,978	35,717
Silver Bow 2/	121,592	109,202	107,405	1,797
Sub-total	3,337,300	2,582,778	2,516,136	66,642
Percent of sub-total		100.00	97.6	2.4
Yellowstone Park in Montana	139,980			
GRAND TOTAL	3,477,280	2,582,778	2,516,136	66,642

1/ Forest Resources of South Central Montana, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana.

2/ Area east of Continental Divide.

Table 3.- Timber Volume of the Upper Missouri Basin 1/

County	Saw Timber 2/ Softwood	 Hardwood	 Total	All Timber 3/ Softwood	 Hardwood	 Total
	M Board Feet			M Cubic Feet		Total
Beaverhead	2,266,101	10,022	2,276,123	1,269,763	18,385	1,288,148
Broadwater	421,259	1,974	423,233	199,206	2,068	201,274
Deer Lodge 4/	111,743	3,406	115,149	86,981	697	87,678
Gallatin	2,346,729	4,359	2,351,088	944,866	7,557	952,423
Jefferson	705,614	9,298	714,912	469,135	6,173	475,308
Madison	1,335,520	25,326	1,360,846	558,018	22,561	580,579
Silver Bow 4/	439,566	147	439,713	160,144	1,503	161,647
Total	7,626,532	54,532	7,681,064	3,688,113	58,944	3,747,057
Per Cent of Total	99.3	.7	100.0	98.4	1.6	100.0

1/ Forest Resources of South Central Montana, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana

2/ Trees 11.0 inches and larger in diameter as measured by International ¼" rule.

3/ The volume, excluding bark, of sound trees and the sound volume of cull trees from 1 foot stump to a 4.0 inch minimum top diameter.

4/ Includes only that volume on area east of Continental Divide.

There are many areas of historical as well as esthetic importance which have been reserved for public use. Many more of these are in the process of being preserved for the use of present and future generations. One such area in the Upper Missouri River basin is the "Headwaters of the Missouri River State Monument", dedicated to the Lewis and Clark Expedition which made known to white men the origin of the Missouri River and opened up the Northwest.

Great numbers of people visit the basin's scenic, cultural, and recreational areas each year. No accurate figures are available to show just how much recreational use is made of the basin, but we do know that the National Park Service has maintained for many years travel statistics within the areas they administer. This trend of increased travel in the parks and surrounding areas within the basin gives some indication of the appeal that the basin's scenic and recreational areas have for the people of the world.

This region is rapidly becoming "vacation land" for our ever increasing population. The tourist trade is now in third place of the basin economy. Each year brings a steady stream of city bound millions to this museum of natural history. Many of these vacationers are seeing these wonders for the first time, others keep coming back year after year.

Yellowstone National Park draws sightseers from every state in the Union, as well as from foreign countries. The Bighole National Monument, commemorating the battle between Chief Joseph's fugitive Nez Perce Indians and the United States troops under General Gibbon, is visited yearly by many vacationers. Virginia City, cradle of Montana history, is enjoying a new boom, this time it's tourists. Lewis and Clark Caverns, now a State Park, and the Headwaters of the Missouri River State Monument are other scenic and historic points of interest which attract many visitors.

Hot springs abound throughout the region. The springs at Boulder, Jackson and Elkhorn are the most fully developed and have well appointed hotel resorts. Hot springs located at Pipestone, Twin Bridges, Silver Star and Potosi are developed to a lesser degree.

Four National Forests fall partially within the boundaries of the basin; the Helena, Deerlodge, Gallatin and Beaverhead. Many hundreds of campers, hikers, picnickers, fishermen, hunters, and skiers visit these forests each year.

Dude ranching is a popular industry and many establishments offer excellent accomodations which include pack trips, fishing and hunting trips in season.

The basin has two wilderness areas which attract the lover of forest solitude; the Spanish Peaks Wilderness Area, located in the Gallatin National Forest, and the Pintlar Primative Area, located in the Beaverhead National Forest.

Seven ski runs operate in the basin each winter and are used by many ski enthusiasts. They are located as follows: Jackson ski run, Jackson, Montana; Pipestone ski run, Whitehall, Montana; Elkhorn ski run, Dillon, Montana; Jack Creek ski run, Ennis, Montana; Deep Creek ski run, Townsend, Montana; Bear Canyon ski run, Bozeman, Montana; Bridger Canyon ski run, Bozeman, Montana.

Hunting and fishing are to be found throughout the basin and many sportsmen take advantage of these resources each year. Fishing in the remote mountain lakes is said to rank with the best in the United States, and the waters of Hebgen Reservoir and the Gallatin, Big Hole and Madison Rivers have world renown. Almost every stream supports a fish population. Water fowl are found on the many water courses of the basin and a refuge for these birds is found at Red Rock Lake. Seasonal shooting is usually good.

Wildlife

The basin with its native and introduced species of fish and wild game has made this region one of the outstanding areas for the hunter and fisherman. As one drives along the roads, that parallel the streams, you can see as many out of state cars parked by the streams as Montana cars, which would indicate that as many, if not more, non-residents fish these streams, especially in the southern part of the area. This shows the appeal that this basin has for the fisherman.

The basin has splendid fishing streams such as the Gallatin and Madison Rivers, which rank among the best in the western part of the United States, and many high lakes and streams throughout the area. The fish found in this area are rainbow, brown, brook, golden and cut-throat trout. The grayling is found in the upper reaches of the Red Rock drainages. These small streams are one of the few important grayling habitats left, according to the State Fish and Game Department. The whitefish provides extensive winter fishing in the larger streams of the basin.

Upland game birds are also to be found in limited numbers over the area. There are blue and ruffed grouse, sage hens, Hungarian and Chukar partridges, fool hens, pheasants, ducks and geese to be found throughout the area. There is usually a short open season on grouse, pheasant, and sage hens, but fool hens are protected year round. Also, during the fall there is an open season on water fowl such as ducks and geese. Trumpeter swan is protected and is at home in the Red Rock Lakes National Wildlife Refuge, as is shown by Photograph No. 4.

The basin supplies quite a lot of the Nation's furs. The furbearing species include muskrat, beaver, martin, mink, weasel, otter, skunk and badger. Some of the predatory animals that inhabit this area are coyotes, cougar, lynx, bobcats and an occational timber wolf.

The basin supports a large number of big game species including white tail deer, mule deer, elk, moose, pronghorn antelope, Rocky Mountain sheep, mountain goats, black bear and grizzly bear. There are some buffalo in this area that graze on public domain, but they are private herds. These big game animals contribute considerably to the esthetic attractions of the basin. The opportunity to see these animals in their native habitat has greatly influenced the out-of-state tourist trade to this area. Photographs No. 5 and 6 show two of these big game species in their native habitat.

Demands on our wildlife and recreational resources have increased tremendously in recent years because of the increased population, together with improved roads and transportation facilities and a growing interest in hunting and fishing.

All multiple purpose water conservation structures in the Missouri River Basin under the Bureau of Reclamation program are being planned and constructed to permit their maximum utilization for boating, fishing, camping and other forms of recreation for the local people as well as for the tourists. They will likewise serve other conservation objectives, such as providing habitat and feeding grounds for fish and wildlife. These new sites will greatly help in satisfying this increased demand for recreation.

Several thousand hunters and fishermen are now using our public resources. These sportsmen expenditures include license to hunt and fish, guide service, all kinds of equipment, accomodations, food, gasoline and oil, and numerous other things

Photograph No. 4- Trumpeter swans and ducks on the Red Rock Lakes Refuge. (W. E. Banko).

Photograph No. 5- Air view of antelope herd in the Upper Missouri Basin.

Photograph No. 6 - Cow moose and calves below the Continental Divide in the Upper Centennial Valley.

that affect the business in every city and town in the basin. The expenditures of out-of-state guests for lodging, food, gasoline and oil run into the millions. The above expenditures have raised the tourist trade to third place in the businesses of the basin.

Minerals

The Upper Missouri River Basin mineral resources are large. The accompanying map, figure 1, shows their distribution in the basin. Among the mined metallic minerals are lead, silver, zinc, gold, tungsten, manganese, iron, molybedenum, chromium, nickel, uranium, thorium, tin and vanadium and the non-metallic minerals are phosphate rock, talc, sillimanite, coal, corundum, feldspar, garnet, graphite, gypsum, limestone, mica, oil shale, silica, vermiculite, asbestos, and marble.

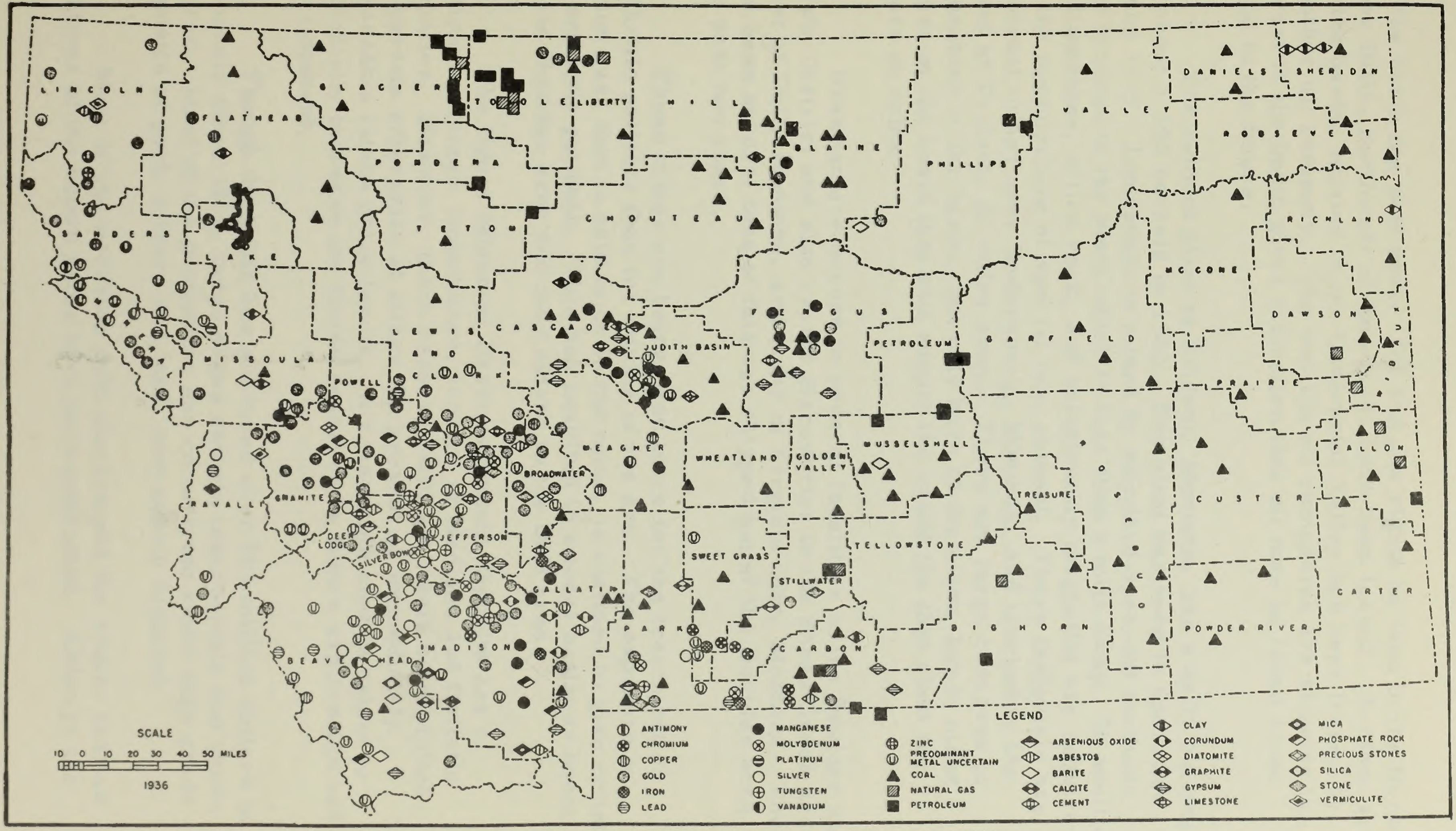
The present high labor and material costs, and a fixed gold price has stopped extensive placer operations. There are a few operators that inted to start dredging for gold in the near future. The Tertiary lake beds in the Big Hole River Valley from Divide to Melrose, and the old creek beds covered with lava flows and volcanic ash in Alder Gulch, Wisconsin Creek, and Barton Gulch, appear to offer some mining oppotunities, as well as some others scattered over the basin.

It is estimated that nearly 400,000,000 tons of phosphate rock are available to the manufacturer in southwestern Montana. At the present time one deposit is being mined near Maiden Rock in Beaverhead County by the Victor Chemical Company, which refines elemental phosphorus from the phosphate rock.

The Anaconda Mining Company produces fertilizer from phosphate rock, mined in the Upper Missouri Basin and other areas.

Extensive deposits of pure graphite occur in Beaverhead County, near Dillon, Montana, which compare well with the best Ceylon graphite. These mines are inactive at present, but indications are that they soon may be in operation.

The search for oil and gas in the basin has been conducted intermittently by local organizations. During World War II the oil shales, south of Dillon, were drilled, and more recently drilling has been done on the Medicine Lodge Creek. No oil or gas has been found to date. Leasing of lands for oil has been started by several oil companies and by local organizations and individuals



MAP OF MONTANA SHOWING AREAL DISTRIBUTION OF MINERAL RESOURCES

in the basin the past year. Oil and gas rights on land in the Horseshoe Hills, northwest of Bozeman, have been leased. Another area of the basin, located in the Centennial Valley has been leased by another oil company. The way the oil companies are showing interest in the basin gives indication that oil may be found some time in the future.

The cement plant at Trident, Montana, had a daily out-put of about 3,500 barrels in 1952. The plant has been in operation since 1910. Limestone is mined by standard open-cut methods, and trucked to the plant which is less than a mile away. In addition to limestone, silica rock, and occasionally magnetite are required in the manufacture of special type cement. These materials are contract mined near Radersburg, Montana, and trucked to the plant at Trident, 30 miles away. There are large reserves of limestone in the basin, not only here at the plant, but in other areas of the basin that will supply the needs for this plant for years to come.

Uranium ore occurs in several localities in the Boulder and Basin District and also recent discoveries in the Sheep Creek area west of Dell, Montana, and north of Virginia City, Montana. There has been several tons of this ore shipped out of the Boulder area the past two years.

These mines are being used more for the treatment of arthritic patients than for mining of the ore. The exposure to radon gas, that is said to be in the mine, is claimed to give relief to arthritic patients. This has resulted in a local business boom in the Boulder area and may extend to the Dell area.

The Upper Missouri Basin corundum deposits are of national strategic importance, located in Madison and Gallatin Counties. However, these reserves will not likely be exploited by private enterprise at either the present or immediately forseeable future price levels. A reasonable chance exists to materially increase the known reserves by future exploration and development.

Though the basin has produced over 200 million dollars in minerals since 1862, large areas remain inaccessible and unexplored. Most of the production has come from small high grade deposits of gold, silver, and lead, now nearly depleted.

Most of the workable gold placers and the richer shallow portions of the known lodes have been exhausted. Although the basin's remaining marginal reserves are apparently large, their development and successful exploration will depend on vastly improved mining techniques or the reversal of the present day economic trends.

The present trend of mining in Beaverhead, Jefferson, and Madison Counties is toward the utilization of multi-metal ores containing zinc and low grade strategic minerals, such as corundum, chromium, thorium, molybdenum, nickel, vanadium, tin and manganese. The greatest expansion is from tungsten mining and milling, phosphate rock mining and talc mining in the Dillon area. A tungsten ore concentrating plant is now being constructed near Glen, Montana. All of these minerals are of importance to our national defense. The future mining activity in Broadwater County will continue to center principally in the Indian Creek and Radersburg regions. Future mining activities in Gallatin County will be centered principally on the production of non-metallic minerals. The mining and processing of limestone for cement manufacture is closely linked with the development and industialization of the region.

In the past, the value of the metallic minerals produced in the Upper Missouri Basin has far exceeded that of the non-metallics. In recent years, however, the non-metallic mineral values produced, including mineral fuels, have been gradually increasing and at present the production of non-metallic minerals exceeds metal production in total value.

Further information on the mineral resources of the basin may be found in reports put out in 1950 and 1952 by the Bureau of Mines, on the mines and mineral deposits in Jefferson, Beaverhead, Madison, Broadwater and Gallatin Counties.

Water Resources

The Missouri River extends 60 miles above the Canyon Ferry Dam to the point of its formation at the confluence of the Jefferson, Madison, and Gallatin Rivers a few miles northeast of Three Forks, Montana. These three rivers and their principal tributaries form a mature and well established drainage pattern for the entire basin.

The Madison, Jefferson and Gallatin Rivers, and many other mountain tributaries, afford excellent potential storage sites and facilities. The waters of these rivers and their tributaries furnish large supplies of water for irrigation. The basins of these rivers along with the Missouri River, although extensively utilized, still offer opportunities for additional irrigation and water storage.

Numerous hot springs are frequently found in the mountains and along the foothills, but they have little practical use, except in connection with resort and dude ranches. Very few wells have been drilled for the express purpose of securing water for irrigation. Domestic water in the mountain areas, is easily obtained from surface sources, but in areas away from the mountains wells must be drilled to depths of 100 to 300 feet to obtain water in satisfactory quantity.

Owing to the wide seasonal fluctuation in the rate of run-off, development involving the diversion and the use of water in the basin is in a large measure dependent upon the storage available for regulating the stream flow. In some areas of the basin the water resources are generally adequate for the agricultural activities concerned but in others they are short and need supplemental water to meet the demand.

The Lima Reservoir located on the Red Rock River at the lower end of Centennial Valley is an earth filled dam 50 feet high, in the narrows leading to lower Red Rock Valley. It has a surface area of about 5,000 acres and its capacity is about 87,000 acre feet. This water is used by ranchers and farmers in Red Rock Valley. The Ruby Reservoir of 38,900 acre-feet capacity was built by the Montana State Water Conservation Board, on Ruby River. This reservoir is used by farmers and ranchers in the Ruby Valley. The Delmoe Reservoir is used for storing of water for irrigation in the Pipestone Creek drainage and the Jefferson Valley.

There are many permanent streams and wells that have been developed for livestock water, to improve forage utilization and to serve the range for which natural surface waters are not available. In general the Upper Jefferson basin has sufficient water for livestock, but in some areas this could be improved.

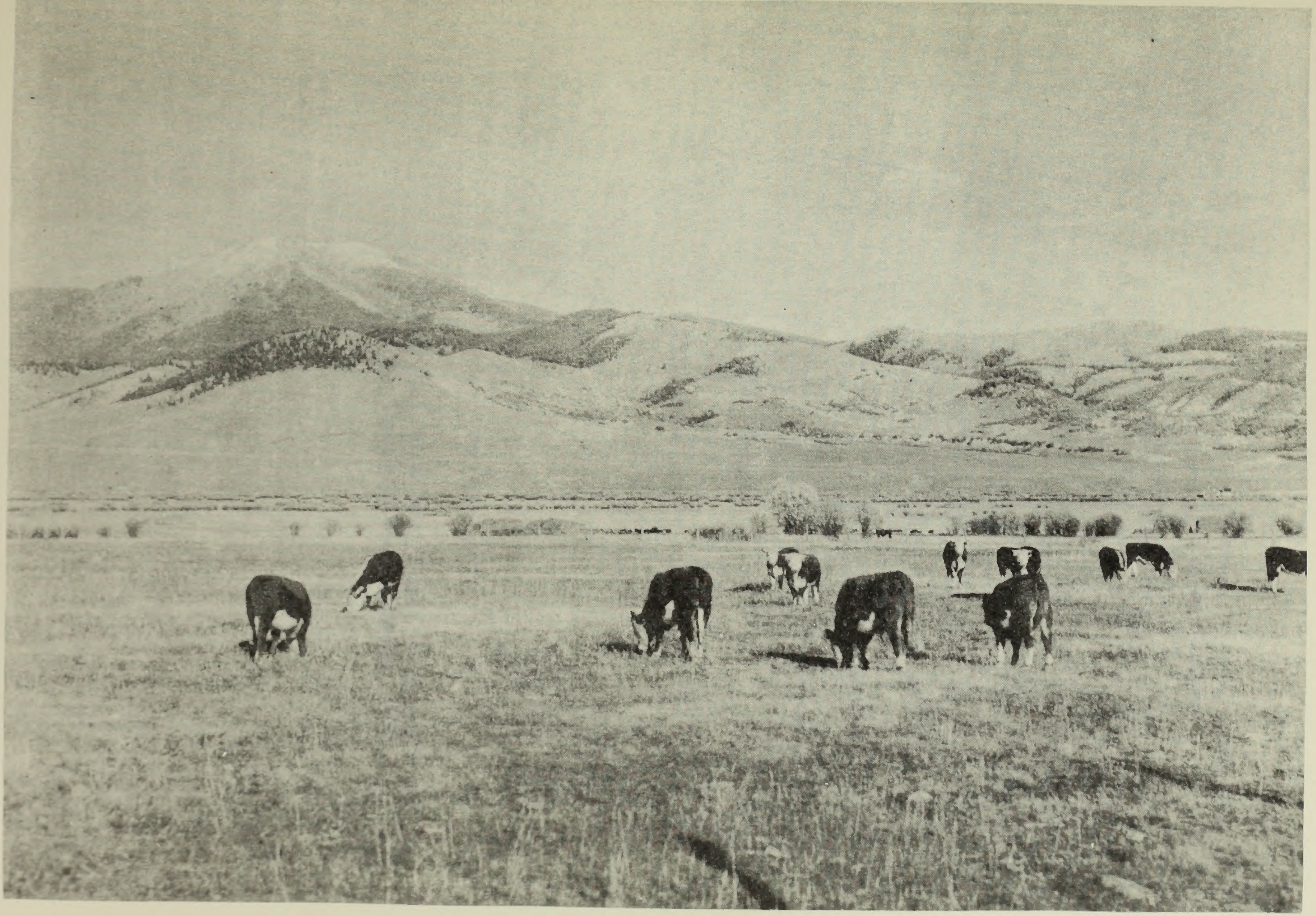
The lower part of the Jefferson Basin, as well as the drainage area of the main stem of the Missouri River, is inadequate as to water resources, both in respect to arable land and the range. The Willow Creek Reservoir supplies irrigation water to areas along Willow Creek which is part of the Three Forks Unit. The completion of the proposed Bureau of Reclamation projects in the Jefferson Division and the Three Forks Division will provide facilities to handle additional acreage and supplement the irrigable land now under cultivation. These projects will accomplish little in the way of stockwater and the problem of distribution on a poorly water range remains. There are a large number of natural springs located in the basin that need to be developed in order to properly utilize the range, together with maintaining those that have already been developed, as will be indicated on the land classification map.

Further information on water supply of this basin is contained in the "Preliminary Land Planning and Classification Report of the Upper Missouri River Basin", by the Bureau of Land Management, dated April 1953.

LAND USE AND OWNERSHIP

The Federal Government is, and will probably continue to be, the largest landowner in the basin. About 58 percent of all land in the basin is in public ownership, with the Federal Government owning 52 percent and the State 6 percent. The Interior Department administers about 17 percent of the basin with 12 percent under the jurisdiction of the Bureau of Land Management. The remaining 35 percent is administered by the Forest Service.

Seventy-nine percent of the study area is principally used in the production of range livestock and 8 percent of the area (excluding National Forests) is used for the production of timber. Most of the public domain has multiple use values. For example, it may be valuable for grazing, wildlife, watershed, recreation, timber production, and mining or any combination of these uses. Nearly all of this area is important as wildlife habitat, there being very little of the area that is not inhabited by some type of game. The basin has splended fishing streams that are very important to the local people, as well as to the tourists for sport and recreation. Thousands of choice locations are used as camp and picnic grounds. The area is important for the production of metallic and nonmetallic minerals. Most of these uses do not conflict with the livestock industry except in some local areas of the basin. Approximately one percent of the basin is taken up by townsites, industrial sites, lakes, rivers, reservoir sites, airports and other miscellaneous uses. The remaining 12 percent of the lands are devoted to cultivated crops, about 23 percent of which is dry farmed and the other 77 percent irrigated lands. Land use is shown graphically in figure 2. The status of land ownership (excluding National Forests) within the study area is shown in table 4 and graphically in figure 3. Photograph No. 7 shows several land uses, such as timber, range, wildlife and crop.



Photograph No. 7- Land Uses: Forested area in the distance, range area between forest and hay meadow.

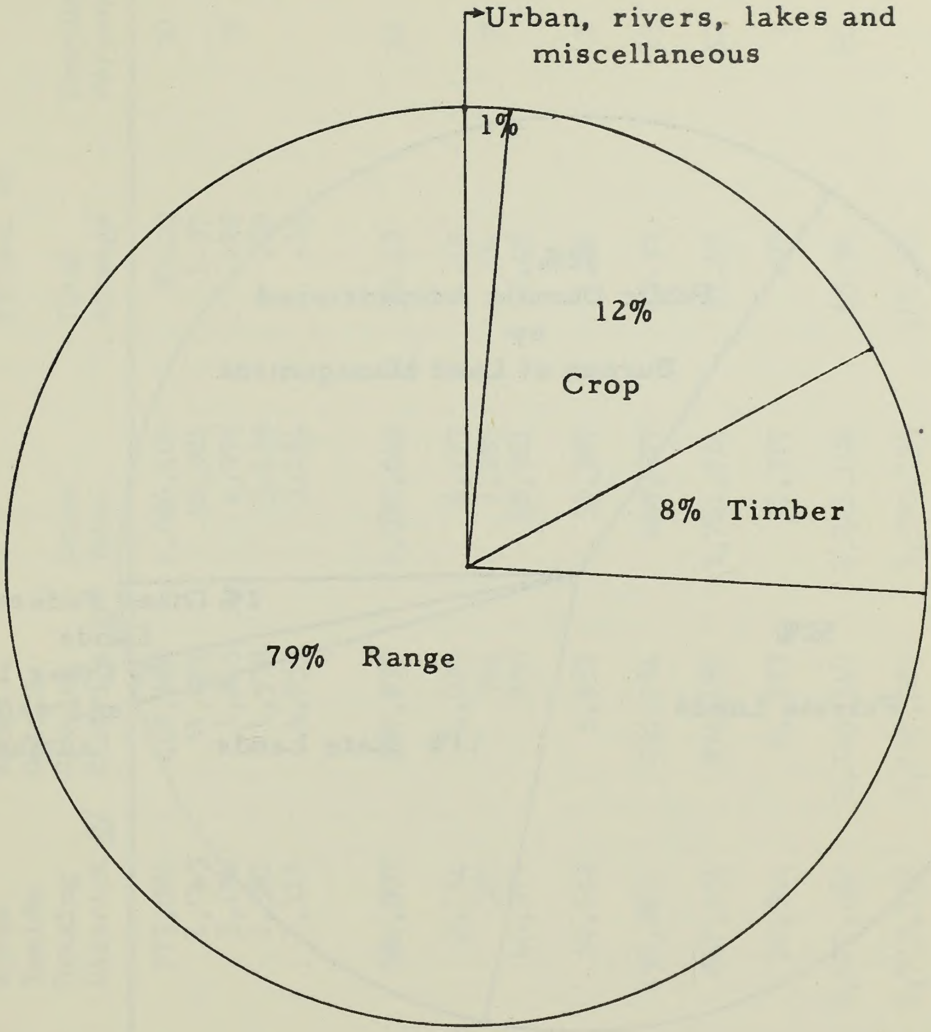


Figure 2. - Land Use Within the Study Area of the Upper Missouri Basin, 1953

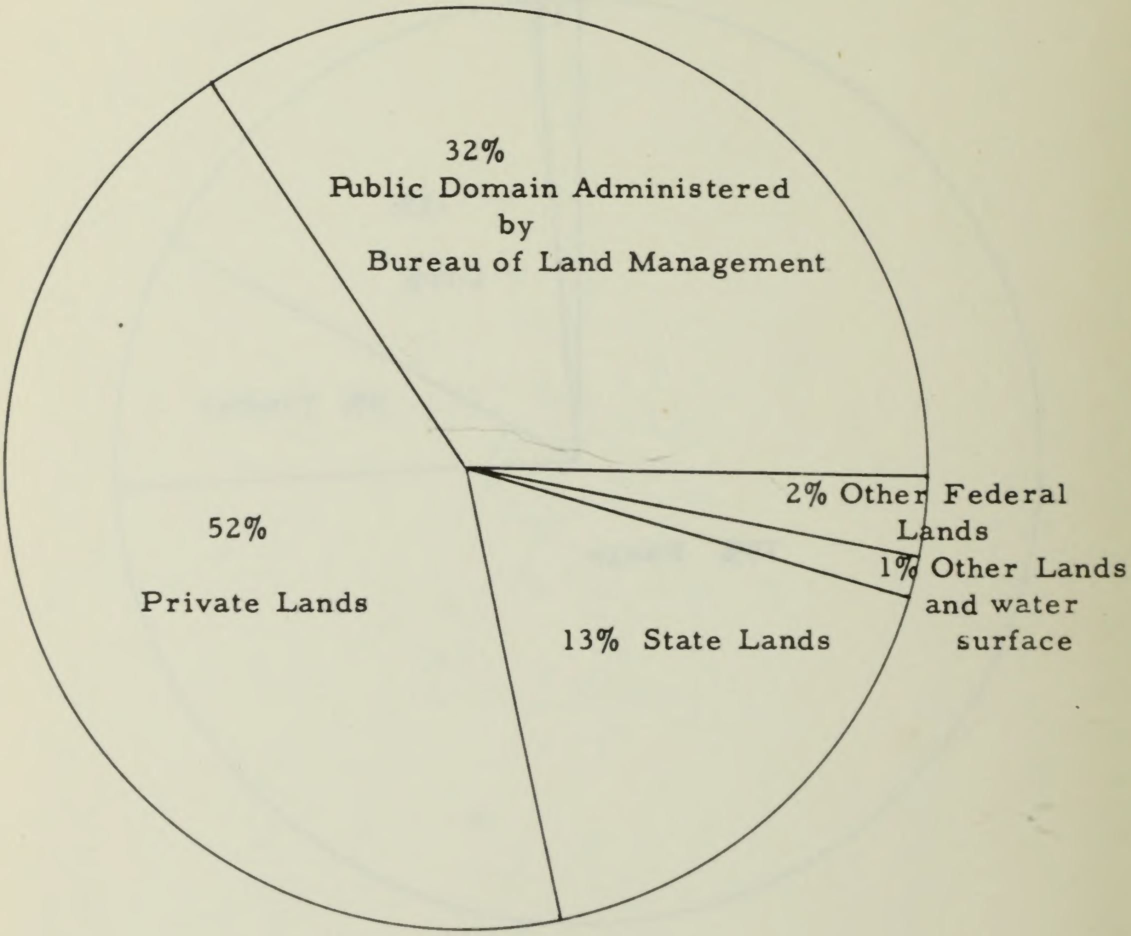


Figure 3. - Land Ownership Within the Study Area of the Upper Missouri Basin, 1953, Exclusive of National Forests, National Parks, and State Parks.

Table 4.- Breakdown of Total Acres by Land Ownership Classes, Within the Study Area of the Upper Missouri Basin, Montana, 1953 1/

Status	Acres Inside Grazing District 2/	Acres Outside Grazing District 2/	Acres Total	Percent of Total Acreage	Rounded Percent
Public Domain	577,885	448,520	1,026,405	30.40	30
Stock Driveway	1,040	51,881	52,921	1.57	
Power Site	3,190	1,805	4,995	.22	2
Public Water Reserve	1,581	1,578	3,159	.09	
Reservoir Site Withdrawal	1,111	4,053	5,164	.15	
Total Lands Administered By Bureau of Land Management	584,807	507,837	1,092,644	32.42	32
Purchase Reclamation Withdrawal	2,154	4,023	6,177	.18	
Reclamation Withdrawal	325	964	1,289	.04	2
Other Federal Lands	40,071	850	48,921	1.46	
Total of Other Federal Lands	50,552	5,837	56,387	1.68	2
State Lands	193,283	254,794	448,077	13.30	13
Private Lands	867,534	874,180	1,741,714	51.67	52
Other Land and Water Surface	16,944	14,373	31,317	.93	1
Total of All Other Lands	1,077,461	1,143,347	2,221,108	65.90	66
GRAND TOTAL	1,713,118	1,657,021	3,370,139	100.00	

1/ Compiled from records of field surveys and investigations made by the Bureau of Land Management.
2/ Grazing districts established under the Taylor Grazing Act.

AREA ECONOMY

The economy of the Upper Missouri River Basin in the space of the last 100 years has evolved from one of gold mining to a seventy-million dollar agricultural and industrial economy based on the natural resources of the basin. Mining was the leading industry until the Northern Pacific Railway reached the area in 1883 and made possible the development of the livestock industry and agriculture resources.

The population of the basin in 1950 was approximately 42,700 people. Of this amount 23,988 lived in cities and towns and 17,712 lived on ranches and farms in the basin. (For further information concerning the population, see the preliminary report of this area.)

An interconnected network of transmission lines provides electrical energy for all areas of the basin. Natural gas is supplied to the basin by a pipeline from fields outside of the area and supplies, Bozeman, Three Forks and Whitehall, Montana.

The principal industries of the basin in order of importance, based on the gross annual income, are livestock raising, farming, tourism, mining and lumbering. The comparatively large amount of land in the basin which is primarily suited for grazing use is the principal factor responsible for the importance of the livestock enterprise.

Ranches and range land values reached an all time high in 1952. Sale prices for range land in the basin have varied from $2.50 an acre to $15.00 an acre. Livestock ranches with improvements, hay meadows and grazing land have been selling from $5.00 an acre to $36.00 an acre. Dry farm lands and improvements have been selling from $8.00 an acre to $105.00 an acre, depending on locality and productivity of the land. The valuation of animal units in dollars varies from one county to another due to the market price of land. The amounts invested per animal unit in this area range from $240.00 to $380.00, depending on improvements placed on the land, as well as location and stability.

The economic potential of the Upper Missouri Basin is estimated as follows:

1. 5,247,226 acres of range land are capable of producing forage for approximately 131,181 animal units of livestock(does not include National Forests). This is the basis for an annual livestock production of over 40 million dollars, based on 1950 prices.

2. Approximately 666,000 acres of irrigated land producing hay, grain, sugar beets, seed potatoes and other crops valued at about 24 million dollars (1950 prices).

3. Approximately 196,000 acres of non-irrigated land producing hay, grain and other crops valued at about 6.5 million dollars at 1950 prices.

4. Timber reserves of approximately 46 billion board feet, with an allowable cut on a sustained yield basis of 50,000 MBF.

5. A dairy industry which sold 1.5 million dollars worth of produce in 1949 and is capable of expansion.

6. A recreation industry which has climbed to third place in the basin economy and is constantly expanding. (Now totals approximately 25 million dollars annually for the entire area above Canyon Ferry Dam. 3/)

7. Economic establishments within the basin are as follows:

(a) 2,688 farms and ranches, as shown in the following tabulation: 4/

County	Number	Average Size
Beaverhead	370	3,956 acres
Broadwater	278	2,083 acres
Gallatin	1,129	832 acres
Jefferson	281	1,369 acres
Madison	630	1,754 acres
Total	2,688	

(b) Seven manufacturing establishments which process grain, vegetables, cement and asbestos.
(c) Sixty-four wholesale distributors of commodities.
(d) Six hundred twenty-three retail stores of all types.
(e) One hundred thirty-four service type establishments.
(f) Twenty-nine hotels.
(g) Sixty-nine tourist courts.
(h) Fiscal data:
(1) Ten banks with deposits of over thirty-six million dollars.
(2) Wages in excess of thirty-nine million dollars.

3/ Senate Document No. 191, Missouri River Basin, April 1944, p. 59.

4/ Mont. Dept. of Ag. Lab. and Ind. and USDA, Bureau of Ag. Econ. Mont. Agric. Statistics, Helena, Montana, December 1952.

(3) Retail sales in excess of forty-two million dollars.

8. At present the hydroelectric production of over 76 million kilowatt hours annually is being produced in the Upper Missouri Basin. When completed the Canyon Ferry Unit will add to this total output an estimated annual production of 285 million kilowatt hours.

Seventeen potential power sites have been investigated in this area by the Bureau of Reclamation with a potential production of 1,075 million kilowatt hours annually from a possible installed capacity of 197,900 kilowatts. (Data regarding each of the potential sites are listed in table 28, page 96, Power Resources, Requirements and Supply, Missouri River Basin, Bureau of Reclamation, Regions 6 and 7, July 1951.)

HISTORY OF RESOURCE USE

The first authentic information in regard to this part of the basin is to be found in the logs of the Lewis and Clark expedition to the Northwest in 1805 and 1806, and from the diaries of the members of this party. Other historic material is found in accounts of the early trappers and reports of other expeditions which were organized to investigate the natural resources of this area and to determine a route for the railroad.

The livestock industry was founded in this part of the country in the summer of 1862. 5/ During the subsequent years the industry grew, and on January 31, 1865, the legislature of the territory was called upon to pass the "Act concerning marks and brands". The early cattle raisers established their herds to supply the demand for beef from the local mining camps. Once the industry gained a foothold, other markets were sought, and in October 1868 the first beef drive was made from the area to Salt Lake City, Utah. Subsequent drives were made to this market until the Northern Pacific Railway reached the area in 1883. This event opend the markets of the East and the livestock industry skyrocketed. At the end of 1884, there were 149,000 cattle in the Upper Missouri Basin valued at $5,116,260.00. 5/

Sheep had been introduced to the region prior to 1883 but made little progress. With the new markets, however, sheep raising became more popular and lucrative. Shipments via the

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5/ Lesson, Michael A., History of Montana 1739 - 1885, Chicago, Warner, Beers, and Co., 1885.

Northern Pacific Railroad in 1884, were as follows: 6/

Wool	748,662 pounds
Hides, pelts and furs	713,213 pounds
Cattle	76,560 head

Sheepmen did well in this country, their greatest loss being from wolves. Cattle raising, however, predominated.

The estimated cost of raising a four year old steer in 1885 was $3.80 and the market value was between $18.00 and $30.00 at the railroad. Estimated profit in cattle raising during this era was between 30 to 45 percent. The reason for this condition may be seen in the following quotation: "...The customary way of managing a herd of cattle in Montana is simply to brand them and turn them out on the range. Some stock owners give no more attention to their cattle..." 6/

The winters were mild and the range was good, as indicated by the following quotation: "...The bunch grass which everywhere abounds is wonderfully sweet and nutritious... The immense grass fields are so large that in riding over them one would have some difficulty except for the trails, to select the lands upon which the cattle had been feeding and those which had not been touched...The bunch grass grows not only all over the valleys and benches, but on the foothills, and even on many of the mountains themsleves. The supply of it is inexhaustable..." 6/

This situation prevailed until the 1900's when several state agencies and the Northern Pacific Railroad attempted to develop the agricultural resources of the State by enticing settlers to the area. Choice tracts of range land were settled and fenced under the 160-acre Homestead Act, Enlarged Homestead Act, Stock-raising Homestead Act, and later under the Desert Land Act. A large amount of this land went to patent via railroad land grants, some of this was then sold to settlers. Even with this influx of homesteaders the livestock were handled in much the same manner as previously cited, differing only in smaller operations being more numerous and in larger total numbers of livestock. Most of the "live water" passed to private ownership under the settlement claims, along with the most desirable tracts of range. From 1862 until the 1930's the number of stock turned out to graze the range increased steadily, and, as has been shown above, the available

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6/ Lesson, Michael A., History of Montana 1739 - 1885, Chicago, Warner, Beers and Co., 1885.

range steadily decreased. It is difficult to say just when the numbers of stock first exceeded the carrying capacity of the range. For all practical purposes, it may be assumed that it happened somewhere around 1900, and range deterioration started. The situation grew steadily worse until the 1930's. The more palatable species of forage were replaced by those less palatable. The bunch grass referred to in the foregoing quotations all but disappeared in the foothills of the mountains. It was replaced by an association of blue grama, needleandthread and prairie junegrass. Snakeweed is today a notable component of this association. This forage, while it provided a surface cover, produced very small amounts of feed even in optimum years.

During the drought years of the "thirties" many valuable range forage plants disappeared. The ranchers and farmers of the region were hard pressed and only the most stable operations survived.

This use and abuse, made of the remaining public range prior to 1934, was without control. In 1934 the Taylor Act was passed and the first step toward the modern concept of range management was made. Subsequent steps, however faltering, have been made in the direction of correct and sustained yield management.

The following tabulation shows present numbers of livestock in the basin, as of 1951. 7/

	Numbers	Animal Units
All cattle and calves	258,000	258,000
Horses and mules	18,500	18,500
All stock sheep and lambs	283,000	56,600
Milk cows	14,300	14,300
	574,800	347,400

On public domin there are, at present, 490 operators running 172,816 permitted stock, utilizing 2,073,792 8/ animal unit months of feed. This includes all public lands in the Upper Missouri Basin administered by the Bureau of Land Management and some National Forest lands.

7/ Montana Dept. of Ag. Lab. and Ind. and USDA, Bureau of Ag. Econ., Mont. Agricultural Statistics, Helena, Montana, Dec. 1952.

8/ This total can be checked by adding the total animal units and animal units months of tables 5 and 6.

Tables 5 and 6 show size and type of livestock operations which are dependent, at least in part, upon the public range. Tables 7 and 8 show the type and source of feed for livestock which use public domain both inside and outside the grazing district and within the Upper Missouri Basin drainage. Tables 9 and 10 show the estimated seasonal grazing use of the federal range by class of livestock, both inside and outside the grazing district and within the Upper Missouri Basin drainage.

The total cash receipts from the sale of livestock and livestock products in the Upper Missouri Basin was, in 1951, $34,862,000. 9/ The total receipts from crops were $10,927,000. As can be seen from these figures the livestock business is still, as it was in the 1880's, the backbone of the economy of this area.

Farming had its origin in this region shortly after the livestock industry, but on a small scale. The Gallatin Valley was the first to be developed, as is indicated by the following assessments, made in 1881: 31,416 cattle, 19,051 sheep, 7,837 horses. The population of Gallatin County at this time was 3,643. Some irrigating was done as early as 1864, but most of the farming was done on dry land. The main crops grown were wheat, oats, and barley. Prior to the coming of the railroad, these crops were used locally and mills for their manufacture to flour and feed were set up. Yields for dry land wheat were known to have gone as high as 69 bushels per acre. Many choice tracts continued to be taken up, and as the population increased, further developments in irrigation were made as well as in dry farming. By 1921, approximately 140,000 acres were under irrigation and 180,000 acres were being dry farmed in Gallatin County alone. The progress of farming in Gallatin County was indicative of the progress made in other counties of the basin, but nowhere was the progress as great. Gallatin County is today the most highly developed area within the basin.

Irrigated land in the other counties was in 1921, as indicated below: (approximate figures) 10/

Beaverhead County	19,900 acres
Broadwater County	40,000 acres
Jefferson County	5,500 acres
Madison County	100,000 acres
Sub-total (counties other than Gallatin)	165,400 acres
Gallatin County	140,000 acres
Total Upper Missouri Basin	305,400 acres

9/ Mont. Dept. of Ag. Lab. and Ind. and USDA, Bureau of Ag. Econ. Mont. Agricultural Statistics, Helena, Montana, December 1952.

10/ Stout, Tom, Montana-Its Story and Biography, Vol. I, The American Historical Society, Chicago and New York, 1921.

Table 5.- Size and Types of Livestock Operations in Montana Grazing District 5
Upper Missouri River Basin, Montana, 1953 1/

Animal Units Owned (Number)	Cattle Operators (Number)	Cattle Total (Animal Units)	Sheep Operators (Number)	Sheep Total (Animal Units)	Combination Operators (Number)	Combination Total (Animal Units)	Total All Classes Operators (Number)	Total All Classes Total (Animal Units)	Total Yearlong (AUMS)
1-50	27	785			1	25	28	810	9,720
51-100	33	2,537	2	155	1	63	36	2,755	33,060
101-200	46	6,956	1	200	6	846	52	7,987	95,844
201-500	46	15,521	1	212	12	3,851	59	19,684	236,208
500-1000	23	17,208	2	1,520	4	2,593	29	21,321	255,852
Over 1000	7	12,429			2	3,000	9	15,429	185,148
Total	182	55,436	6	2,087	26	10,378	213	67,986	815,832

1/ Compiled from records of Montana Grazing District 5, Whitehall, Montana, Bureau of Land Management, Region III, Billings, Montana.

Table 6.- Size and Types of Livestock Operations Outside Montana Grazing District 5
Upper Missouri River Basin, Montana, 1952 1/

Animal Units Owned (Number)	Cattle Operators (Number)	Cattle Total (Animal Units)	Sheep Operators (Number)	Sheep Total (Animal Units)	Combination Operators (Number)	Combination Total (Animal Units)	Total All Classes Operators (Number)	Total All Classes Total (Animal Units)	Total Yearlong (AUMS)
1-50	41	973	3	67	6	196	50	1,236	14,832
51-100	47	3,530	1	74	8	598	56	4,202	50,424
101-200	41	6,378	2	231	14	1,805	57	8,414	100,968
201-500	39	12,844	4	1,321	18	6,047	61	20,212	242,544
500-1000	15	9,785	7	4,569	12	9,814	34	24,168	290,016
Over 1000	9	22,401			10	24,197	19	46,598	559,176
Total	192	55,911	17	6,262	68	42,657	277	104,830	1,257,960

1/ Includes all public lands administered under Section 15, of the Taylor Grazing Act, within the Upper Missouri River Basin, Montana. Compiled from records of Montana Grazing District 5, Whitehall, Montana, Bureau of Land Management, Region III, Billings, Montana, and from records contained in the county recorder offices in Beaverhead, Broadwater, Deer Lodge, Gallatin, Jefferson, Madison, Meagher, Lewis and Clark and Silver Bow Counties.

Table 7.- Type and Source of Available Feed for Livestock Permitted in Montana Grazing District 5 Upper Missouri River Basin, Montana, 1953 1/

Type and Source of Feed	Winter Dec. - Feb. AUMS.	Spring Mar. - May AUMS.	Summer June - Aug. AUMS.	Fall Sept. - Nov. AUMS.	Yearlong AUMS.	Percentage of Total Feed
Hay, Concentrates - Private	343,976	171,988			515,964	40.8
Pasture - Private	42,997			214,985	257,982	20.4
Range - Private	106,273	70,849	23,616	35,425	236,163	18.7
Range - Public Lands Within Grazing District	7,048	19,023	42,985	25,696	94,752	7.5
Range - Public Lands Outside Grazing District	5,834	7,779	11,669	13,613	38,895	3.2
Range - National Forest		112	71,229	31,818	103,159	8.2
Hay, Concentrates - Wildlife Refuge	2,052	1,368			3,420	.3
Pasture - Wildlife Refuge	1,418	252	5,853	7,590	15,113	1.2
TOTAL	509,598	271,371	155,352	329,127	1,265,448	100.0

1/ Compiled from records of Montana Grazing District 5, Whitehall, Montana, and Upper Missouri River Basin Report, Bureau of Land Management, Region III, Billings, Montana, expressed in animal unit months of available feed.

Table 8.- Type and Source of Available Feed for Livestock Permitted Outside Montana Grazing District 5 and Within the Study Area of the Upper Missouri Basin, Montana, 1953 1/

Type and Source of Feed	Winter Dec. - Feb. AUMS.	Spring Mar. - May AUMS.	Summer June - Aug. AUMS.	Fall Sept. - Nov. AUMS.	Yearlong AUMS.	Percentage of Total Feed
Hay, Concentrates - Private	300,330	176,665		53,000	529,995	49
Pasture - Private	43,212	32,500		189,285	264,997	24
Range - Private	79,499	53,000	17,665	26,500	176,664	16
Range - Public Lands	12,943	17,260	25,887	30,200	86,290	8
Range - National Forest	100		24,439	10,311	34,850	3
TOTAL	436,084	279,425	67,991	309,296	1,092,796	100

1/ Expressed in animal unit months of feed on public lands, and includes only parts of Beaverhead and Madison Counties, which are within the study area outside Montana Grazing District 5. Compiled from records of Montana Grazing District 5, Whitehall, Montana, Upper Missouri River Basin Land Classification studies, Bureau of Land Management, Region III, Billings, Montana, county records and Forest Service records.

Table 9.- Estimated Seasonal Grazing Use of Federal Range by Class of Livestock in Montana Grazing District 5, Upper Missouri River Basin, Montana, 1951-52
(Animal Unit Months) 1/

Class of Stock	Winter Dec. - Feb.	Spring Mar. - May	Summer June - Aug.	Fall Sept. - Nov.	Total Yearlong
Cattle	1,401	12,968	34,559	16,287	65,215
Sheep	5,550	5,783	7,576	8,938	27,847
Horses	97	272	848	471	1,688
Goats			2		2
Total	7,048	19,023	42,985	25,626	94,752
Per Cent	7.4	20.1	45.4	27.1	100

1/ Compiled from Records of Montana Grazing District 5, Whitehall, Montana, Bureau of Land Management, Region III, Billings, Montana.

Table 10.- Estimated Seasonal Grazing Use of Federal Range by Class of Livestock Outside Montana Grazing District 5, but Within the Study Area of the Upper Missouri River Basin, Montana, 1952 (animal unit months)

Class of Stock	Winter Dec. - Feb.	Spring Mar. - May	Summer June - Aug.	Fall Sept. - Nov.	Total Yearlong
Cattle	7,248	9,666	14,497	16,912	48,323
Sheep	5,436	7,249	10,872	12,684	36,241
Horses	259	345	518	604	1,726
All Classes	12,943	17,260	25,887	30,200	86,290

Average assessments in Gallatin County in 1921 place the value of irrigated land at $105.00 per acre, $49.00 per acre for dry farm lands, and $8.00 per acre for grazing land. [11]

In the years following the first World War boom, homesteaders gradually drifted away from the land and the scars of abandoned fields appeared. The drought years of the "thirties" were the last impetus which caused additional dry farmers to seek livelihood elsewhere.

Conditions came back to normal in the "forties", and with the wartime demand for wheat many of the dry farms were reclaimed. At present, considerable dry farming is done in the basin, as well as a large amount of irrigated farming. Figure 4 shows cultivated acres by crop grown as of 1949 and 1951.

The total cash receipts for crops produced in the area in 1951 were $10,927,000.00. [12] This represents a substantial portion of the income of the basin. It is, however, considerably under the total cash receipts from livestock and livestock products.

The water resources of the basin were first used by the placer miners and by the early settlers of the area for irrigation in 1864. Since that time many reservoirs have been built for both irrigation projects and hydroelectric power. The following table lists the reservoirs built since that time:

Name	Ownership	Purpose
Hebgen Reservoir	Montana Power Co.	Power
Madison Reservoir	Montana Power Co.	Power
Lima Reservoir	Red Rock Valley Irrigation Co.	Irrigation
Willow Creek Reservoir	Montana State Water Conservation Board	Irrigation
Ruby Reservoir	Montana State Water Conservation Board	Irrigation
Delmoe Reservoir	Pipestone Creek Irrigation Co.	Irrigation

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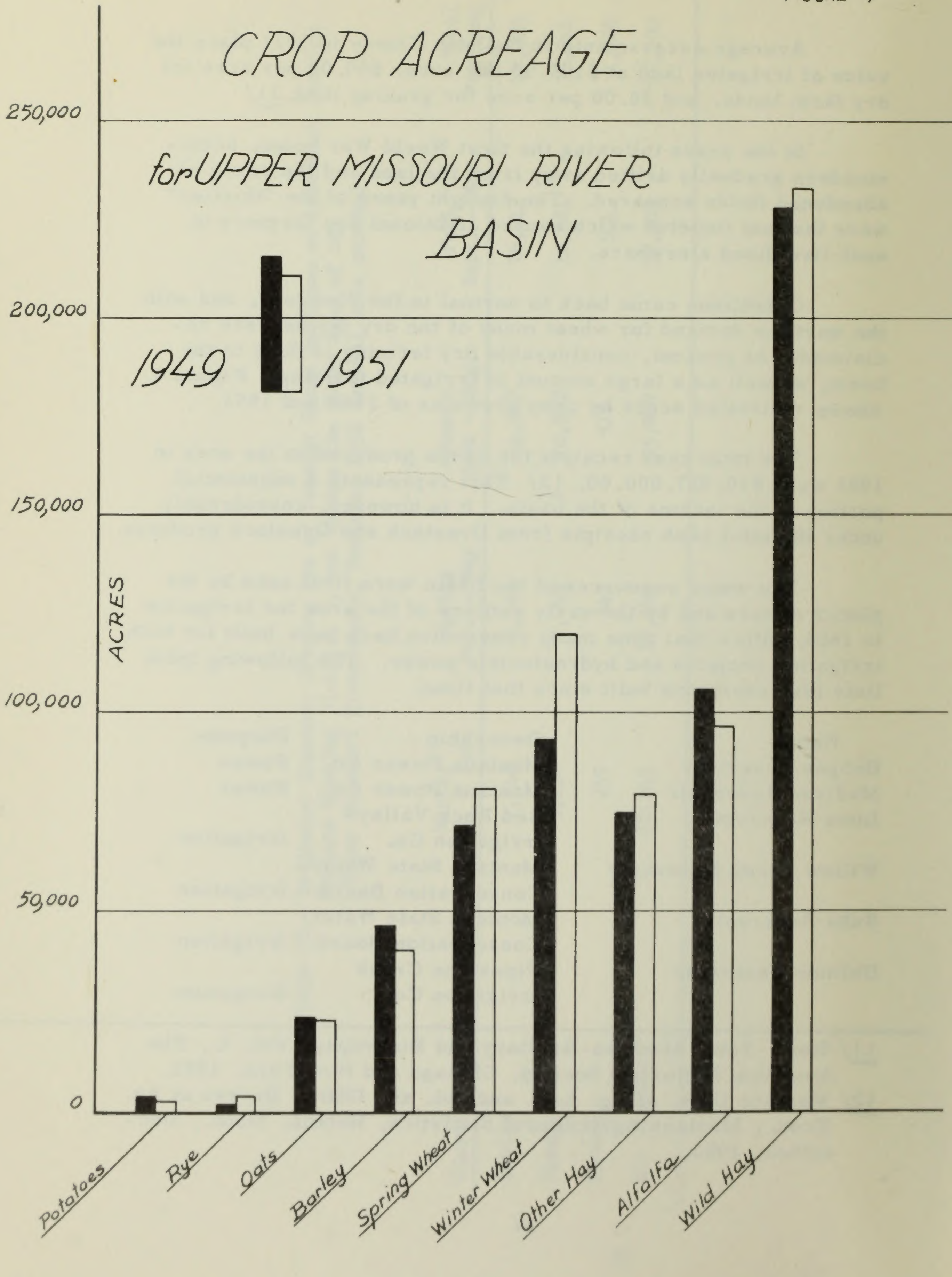
[11] Stout, Tom, Montana-Its Story and Biography, Vol. I., The American Historical Society, Chicago and New York, 1921.

[12] Montana Dept. of Ag. Lab. and Ind. and USDA, Bureau of Ag. Econ., Montana Agricultural Statistics, Helena, Mont., December, 1952.

FIGURE 4


CROP ACREAGE
for UPPER MISSOURI RIVER BASIN
1949
1951
ACRES
250,000
200,000
150,000
100,000
50,000
0
Potatoes
Rye
Oats
Barley
Spring Wheat
Winter Wheat
Other Hay
Alfalfa
Wild Hay

The following proposed reservoirs, planned by the Bureau of Reclamation, will bring into irrigation all the remaining irrigable land for which irrigation is feasible. These reservoirs will also provide supplemental water for those lands now inadequately supplied with water.

Proposed Reservoirs Planned by the Bureau of Reclamation
In the Upper Missouri Basin, Montana, 1951 13/

Name of Reservoir	Storage Capacity acre feet	Units Served
Jefferson Division		
Apex	5,000	West Bench
Bernice	17,000	Boulder
Brenner	15,000	Horse Prairie
Clark Canyon	204,000	East Bench
Landon	21,500	Blacktail
Reichle	898,300	Big Hole
Whitetail	6,000	Whitetail
Three Forks Division		
Beacon	15,000	Gallatin
Eldridge	20,000	Gallatin
Helena-Great Falls Division		
Canyon Ferry	2,051,000	Helena Valley (outside report area)

The timber resources of the basin have a history similar to that of the range resources, but differ in that their importance was recognized sooner, as Congress adopted an act in 1891 that empowered the President to set aside forest reserves for the purpose of protecting the watersheds and to furnish a continuous supply of timber for the use of the public. 14/

The timbered areas of the basin were proclaimed National Forests during the early years of 1900. There were some areas supporting timber that were not reserved for National Forest during this time. The remaining timbered areas were harvested for mine stulls, posts, poles, house logs and low quality saw timber by the early settlers without regard to protecting the watershed or improving the timber stand.

13/ Bureau of Reclamation, Region 6, Project Planning Division.
14/ Trees, Yearbook of Agriculture, 1949.

The timber resources today are being harvested for the same uses as they were during the early settlement of the basin, except that they are now being managed on a sustained yield basis so as to keep the forest lands producing.

The Division of Range and Forest Management of the Bureau of Land Management supervises the harvesting of all timber on public domain lands, so as to protect the watershed as well as improve the timber resources for future use.

Mining began in the basin with the discovery of placer and lode gold at Bannock in 1862. During the same year this discovery was followed by the discovery of silver in the Argenta and Blue Wing Districts on the Rattlesnake drainage. By 1875 the rich gold placers were exhausted and mining shifted to lead, silver and gold lodes.

Production of minerals and metals have been irregular. Periods of accelerated production have resulted from the increased price of gold in 1933, and from higher prices for base metal during World War I and from the period before World War II to date. Also, advances and improved milling machinery have resulted in increased recovery of metal from lower grade base metal ores.

PROPOSED PROGRAM, DEVELOPMENT AND MANAGEMENT OF PUBLIC DOMAIN IN THE UPPER MISSOURI RIVER BASIN

Disposal and Management Unit

In order to facilitate management and supervision of public domain in the Upper Missouri Basin the area has been divided into managment and disposal units. The management unit covers the study area, as mapped. In the disposal unit the classification was limited to the public domain lands.

The management unit covers all lands located in the Jefferson basin above Whitehall, Montana, and the drainage between Whitehall, Montana, and the Canyon Ferry Dam, on the west side of the Missouri and Jefferson Rivers, except on the Big Hole drainage above Ralston, Montana. The public lands in the management areas are of considerable size and concentration and, therefore, lend themselves to economical and effective supervision.

Most of the public domain in the management area has important multiple-use values for watershed, grazing, wildlife, recreation, minerals and timber. There are 1,092,644 acres of public domain land in this area, nearly all of which should be retained in the present ownership and continue to be managed by the Bureau of Land Management. There are 80,068 acres of public domain adjacent to the National Forest and is closely associated therewith in use values. These lands should be administered by the Forest Service. Included within the boundaries of this management area are 316 isolated tracts which should be transferred to private or State ownership by exchange or sale. These isolated tracts range in size from one acre to several hundred acres. They are primarily suited to the grazing of livestock and should be administered in connection with the privately owned lands.

Most of the land in the disposal unit is under private ownership, 48 percent being in this status. National Forest make up 45 percent of the area. State lands cover four percent and the remaining three percent is public domain. The public domain administered by the Bureau of Land Management in the disposal unit comprise approximately 109,000 acres. Certain of the public domain tracts in this portion of the basin are valuable for recreation, wildlife, timber production and watershed values and, therefore, should be retained in public ownership for the use of the public.

Some of the public lands in this area are recommended for transfer to the Forest Service for administration, others to the State Fish and Game Commission for their management, and the Highway Department for wayside parks. Some lands that are mineral in character will eventually be disposed of through the mineral laws. The remaining lands having multiple use values will continue to be administered by the Bureau of Land Management.

Public domain classified in the disposal unit is shown in Table 12, which gives the location of the public domain, its characteristics, present and potential use, and proposed management. The land adjustment map of this report shows the proposed management of all public domain in the Upper Missouri Basin. 15/

Lands recommended for private ownership in this disposal unit total approximately 43,000 acres. These lands are not needed in any public land program and there is no need for them to remain in Federal ownership. Their disposal to private or State ownership will not be contrary to the public interest.

15/ This map is furnished with copies number 1 to 15, inc., of this report.

LAND USE PROGRAMS

Recreation

Use made of the recreational facilities of the basin has increased tremendously in the past decade. This is due to several reasons, of which growing population, improved roads and transportation facilities, and the general improvement of working conditions are important factors. The basic underlying element, is the desire expressed by modern man to return to an intimate association with the land from which he has been divorced by profession. In many cases this desire takes the form of vacation trips to historic and scenic points of interest; in other cases, a secluded cabin for hunting, fishing or just plain resting is all that is required. The National Park Service has kept records of the number of visitors to Yellowstone Park and the past few years these visitors have exceeded one million annually.

Recognizing this need, the Bureau of Land Management has considered this type of land use as highly significant and in this study has recommended the setting aside of areas considered suitable for cabinsites, campgrounds, access for fishing, hunting and picnicking. Approximately 1, 200 acres of land in the basin has been tentatively segregated as being suitable for development for camp and cabinsites under the Small Tract Act of June 1, 1938. These areas are located in about every drainage of the basin, except the upper part of the Big Hole River drainage. These small tracts will range from less than an acre to five acres in size. The location and suitability of these sites is shown by table 11, and also delineated on the land adjustment map of this report. 16/ Other tracts of public domain located along major water courses will be retained due to their multiple uses, one of which is recreation. Tracts of public domain which are located along travelled highways are considered suitable for public use and possible future development by the State Highway Commission.

Public domain designated for recreation use, such as fishing, camping and picnicking should be so marked that the public will know that these are federally owned lands available for public use.

The Bureau of Reclamation, in connection with its development program for the water resources of the basin, has anticipated

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16/ This map is furnished with copies number 1 to 15, inc. of this report.

Table 11.- Small Tract Classification and Recreational Areas for Upper Missouri River Basin, 1953

Twp. North	Range East	Sec.	Subdivision	Name	Suitability
10	1	6	SE$\frac{1}{4}$	Far Views	Campground and recreational area
		5	SW$\frac{1}{4}$	Far Views	Campground and recreational area
		17	NW$\frac{1}{4}$SW$\frac{1}{4}$	Lakeside	Recreational area and small tracts
North	West				
10	1	34	E$\frac{1}{2}$, E$\frac{1}{2}$W$\frac{1}{2}$	Canyon Ferry	Campgrounds and recreational areas
		27	E$\frac{1}{2}$, E$\frac{1}{2}$W$\frac{1}{2}$, W$\frac{1}{2}$NW$\frac{1}{4}$	Canyon Ferry	Campgrounds and recreational areas
		28	E$\frac{1}{2}$NE$\frac{1}{4}$, NW$\frac{1}{4}$NE$\frac{1}{4}$	Canyon Ferry	Campgrounds and recreational areas
		21	SE$\frac{1}{4}$, S$\frac{1}{2}$NE$\frac{1}{4}$, NW$\frac{1}{4}$NE$\frac{1}{4}$, E$\frac{1}{2}$NW$\frac{1}{4}$. NE$\frac{1}{4}$SW$\frac{1}{4}$	Canyon Ferry	Campgrounds and recreational areas
		35	S$\frac{1}{2}$, NW$\frac{1}{4}$, SW$\frac{1}{4}$NE$\frac{1}{4}$	Canyon Ferry	Campgrounds and recreational areas
9	1	1	SE$\frac{1}{4}$, S$\frac{1}{2}$NW$\frac{1}{4}$	Winston	Campgrounds and recreational areas
		3	N$\frac{1}{2}$SE$\frac{1}{4}$	Winston	Campgrounds and recreational areas
		11	S$\frac{1}{2}$S$\frac{1}{2}$NE$\frac{1}{4}$	Winston	Campgrounds and recreational areas
		12	NE$\frac{1}{4}$	Winston	Campgrounds and recreational areas
North	East				
7	4	29	NW$\frac{1}{4}$SW$\frac{1}{4}$, SW$\frac{1}{4}$NW$\frac{1}{4}$	Deep Creek	Wayside Park
		30	NW$\frac{1}{4}$SE$\frac{1}{4}$, NE$\frac{1}{4}$SE$\frac{1}{4}$	Deep Creek	Wayside Park
5	3	31	Lots 3,4,5,6, NE$\frac{1}{4}$SW$\frac{1}{4}$	Toston	Campgrounds
4	2	2	Lot 5	Juniper Berry	Campgrounds
		12	Lots 2, 3, 6, SW$\frac{1}{4}$NW$\frac{1}{4}$	Juniper Berry	Campgrounds
4	3	6	Lots 1, 2, 3, 6, 7, 8, 9, 11, 12,13	Lombard	Campgrounds
North	West				
2	12	34	S$\frac{1}{2}$	Bear Creek	Small tracts
	13	22	SW$\frac{1}{4}$	La Marche Creek	Recreation and campgrounds
		34	S$\frac{1}{2}$S$\frac{1}{2}$	Roberts	Recreation
1	13	18	E$\frac{1}{2}$	Fishtraper	Wayside Parks
	6	3	All	Pipestone Creek	Small tracts
	4	32	SE$\frac{1}{4}$SW$\frac{1}{4}$, Lots 2,3, SW$\frac{1}{4}$SE$\frac{1}{4}$	Warm Springs	Recreation and campgrounds
	13	8	SE$\frac{1}{4}$NW$\frac{1}{4}$, SW$\frac{1}{4}$SW$\frac{1}{4}$	Tucker Creek	Wayside Parks
	14	23	SE$\frac{1}{4}$SE$\frac{1}{4}$	Squaw Creek	Recreation
		26	S$\frac{1}{2}$, N$\frac{1}{2}$NE$\frac{1}{4}$, SE$\frac{1}{4}$NW$\frac{1}{4}$, NE$\frac{1}{4}$NW$\frac{1}{4}$	Squaw Creek	Recreation and small tracts, Wayside Parks
	2	18	Lot 9	Cavern Area	Recreation

-Continued

Table 11.- Small Tract Classification and Recreational Areas for Upper Missouri River Basin, 1953 -Continued

Twp. North	Range West	Sec.	Subdivision	Name	Suitability
1	2	19	Lots 3, 5	Cavern Area	Recreation
		20	Lots 1, 2, 7	Cavern Area	Wayside Park
		22	Lot 4	Cavern Area	Recreation
	1	24	SW¼NE¼	Albro Creek	Recreation
South	West				
1	14	18	SE¼NE¼	Doolittle Creek	Recreation
		4	Lots 1, 2, 3, 4, S½N½, S½	Walker Creek	Recreation
	11	1	All	Kurtichanon	Recreation and campgrounds , Wayside Park
	9	32	Lots 3,4, 8	Bighole	Small tracts
	3	28	NE¼SW¼	South Boulder Creek	Recreation
	1	23	SE¼SE¼	Norweigen Creek	Recreation
		26	NE¼, SE¼NW¼, NE¼SW¼	Norweigen Creek	Recreation
South	East				
2	1	25	Lots 1,2,3,4,5, N½NE¼, SW¼NE¼, E½SW¼	Elk Creek	Recreation
		35	Lots 1,2,3, NW¼SE¼	Elk Creek	Recreation
	2	19	Lots 9, 10, 11	Elk Creek	Recreation
		30	Lots 1,2,3,4,6, SE¼NW¼	Elk Creek	Recreation and wayside park
		6	Lots 1,2,3,7,8,9,10,13,14	Elk Creek	Recreation
South	West				
2	2	31	S½, S½N½	Willow Creek	Recreation
		32	SW¼	Willow Creek	Recreation
	8	1	W½	Camp Creek	Small tracts
	16	3	Lot 3	Mussigbrod Creek	Recreation
		7	SE¼NW¼, SW¼SW¼	North Fork Big Hole River	Recreation
South	East				
3	1	2	Lots 2,3,4,5,6,9,10,11,12	Bear Trap	Recreation and wayside park
		10	Lots 3,5,7,9	Bear Trap	Recreation and wayside park
		14	W½NW¼	Bear Trap	Recreation
		15	Lots 1,2,3,4,5,6,7,8,9,10, NW¼SE¼, SW¼SW¼, SE¼NW¼	Bear Trap	Recreation
		21	Lots 3,6, E½NE¼	Bear Trap	Recreation
		22	Lots 1,2,3,4,5,6,7,8,9, E½SW¼, S½SE¼, NW¼SE¼, SW¼NE¼	Bear Trap	Recreation
		26	NW¼SW¼	Bear Trap	Recreation

-Continued

Table 11.- Small Tract Classification and Recreational Areas for Upper Missouri River Basin, 1953 -Continued

Twp. South	Range East	Sec.	Subdivision	Name	Suitability
3	1	27	NE¼, E½SE¼, W½SE¼, Lots 1,2,3,4,5, 6,7,8, SW¼SW¼	Bear Trap	Recreation
		33	E½SW¼, SW¼SW¼, Lots 1.2,3,4, SE¼NE¼, NW¼SE¼,	Bear Trap	Recreation
		34	Lots 1,2,3,4,5,6, E½E½, W½SE¼, SE¼SW¼, SW¼NE¼, NW¼NE¼, NW¼NW¼, SW¼SW¼	Bear Trap	Recreation
		35	Lots 1,2,3, S½, SE¼NE¼, W½NW¼,SE¼NW¼	Bear Trap	Recreation
4	1	4	Lots 3,4,5,6	Madison River	Recreation
		5	Lots 1,2,7, SW¼NE¼, NW¼SE¼, Lots 5,6, SE¼NE¼, SW¼SE¼	Madison River	Recreation
		8	Lots 1,2,3,4,5,6,7,8, SE¼NE¼, SE¼NW¼, SW¼SE¼, NE¼NW¼, E½SE¼, W½SW¼	Madison River	Recreation
		17	Lots 1,2,3,4,5,6,7,8, NW¼NW¼, NW¼SW¼, NW¼SE¼, SW¼SW¼, E½E½, W½NE¼	Madison River	Recreation
		18	E½E½, SW¼NE¼, NW¼SE¼	Madison River	Recreation
		19	Lots 5,6, NE¼NE¼, SW¼SE¼, NE¼SE¼, SE¼NE¼	Madison River	Recreation
		20	Lots 1,2,3,4,5,6,7, E½, NW¼NW¼, SE¼SW¼	Madison River	Recreation
		30	Lots 1,2,4,5,6,7,8,9,10, SE¼SE¼, SW¼SE¼, NE¼SE¼	Madison River	Recreation
	2	26	E½SW¼, S½SE¼	Spanish Creek	Recreation
South	West				
4	4	5	NW¼	Noble Creek	Small tracts
		6	NW¼	Wisconsin Creek	Small tracts
		2	W½	Ramshorn	Small tracts
5	4	4	S½	Ramshorn	Small tracts
		3	S½, NE¼	Ramshorn	Small tracts
	1	12	SE¼SW¼	Jourdain Creek	Small tracts
		10	NE¼NW¼	Madison Lake	Business lease and small tracts
7	9	13	SW¼SW¼	Dillon	Wayside Parks
	4	4	All	Ruby Reservoir	Wayside Parks
	1	28	S½	Varney	Recreation
8	1	4	N½NE¼	Cherry Creek	Recreation
		10	W½, N½NE¼, W½SE¼	Cherry Creek	Recreation
		14	E½, W½SW¼, SW¼NW¼	Cherry Creek	Recreation

-Continued

Table 11.- Small Tract Classification and Recreational Areas for Upper Missouri River Basin, 1953 -Continued

Twp. South	Range West	Sec.	Subdivision	Name	Suitability
8	1	24	E½, E½SW¼, NW¼SW¼, NW¼	Cherry Creek	Wayside Park
9	10	32	All	Clark Canyon	Recreation
		33	All	Clark Canyon	Recreation
	1	1	Lots 1,2,3,8,9	Hyde	Recreation
		12	Lots 1,2,3,4,5,6,7,8	Hyde	Recreation
		13	Lots 1,2,3,4,5,6,7,8,9,10,11,12, E½SW¼	Hyde	Recreation
		14	NE¼SE¼, Lot 1	Hyde	Recreation
		23	Lots 1,2, SE¼NE¼	Hyde	Recreation
		24	W½NE¼, E½NW¼, SW¼SE¼, Lots 2,3,4, 7,8,9,10	Hyde	Recreation
		25	Lots 1,2,4,5,6,9	Hyde	Recreation
South	East				
9	1	6	Lots 3,4,5,6	Deer Creek	Recreation
South	West				
9	15	23	NW¼, SW¼NE¼	Bloody Dick Creek	Recreation
10	10	6	All	Sacajawea	Recreation
	1	1	E½E½	Nickerson Creek	Recreation
		25	S½NE¼	Horse Creek	Recreation
South	East				
10	1	6	SE¼NW¼, E½SW¼, Lots 3,4,5,6,7	Moose Creek	Wayside Park
		18	N½NE¼, SE¼NE¼	Moose Creek	Wayside Park
		28	NW¼NW¼	Moose Creek	Wayside Park
South	West				
14	10	2	All	Sheep Creek	Campground
		15	SE¼	Sheep Creek	Campground
		22	NE¼	Sheep Creek	Campground
South	East				
14	1	29	All	Alaska Basin	Small tracts
		32	All	Alaska Basin	Small tracts
South	West				
15	4	3	All	Price Creek	Small tracts
North	West				
6	4	31	NE¼NE¼NW¼	Boulder Creek	Campground
	5	25	N½SE¼, SW¼NE¼, W½NW¼	Boulder Creek	Campground, recreation area, small tracts
		24	S½SW¼, NW¼SW¼, less pat. mining claims	Boulder Creek	Campground, small tract, recreation area

-Continued

Table 11.- Small Tract Classification and Recreational Areas for Upper Missouri River Basin, 1953 -Continued

Twp. North	Range West	Sec.	Subdivision	Name	Suitability
6	5	23	E½SE¼, S½N½, less pat. mining claims	Little Galena Creek	Campground, small tract, recreation area
		22	S½N½, NW¼NW¼, NW¼SE¼, NE¼SW¼, less pat. mining claims	Galena Creek	Small tract and recreation area
		15	SW¼	Buttermilk Creek	Recreation area
		9	NE¼	Cataract Creek	Small tracts

recreational developments in the vicinity of its proposed and existing reservoirs. These developments will permit boating, fishing, camping and other forms of recreation by local people, as well as by tourists. The planning and development of recreational use on these reservoirs will be accomplished by Interior agencies and the State. The National Park Service makes the following recommendations for the recreational use and development of the Canyon Ferry Reservoir:

1. Protection of the strip of land along the shoreline from unnecessary development or unsightly structures.
2. Acquisition of private lands in the development areas for recreational facilities, this area contains approximately 660 acres of private land.
3. Development of campground and picnic facilities, including roads, parking areas, tables, boat docks, swimming beaches, wells, cabins, lodges, and toilet facilities at the north end of the lake and along the west shore for fifteen miles.

The National Park Service plans the following developments at the site of the proposed Clark Canyon Reservoir:

1. Sufficient lands be acquired around the perimeter of the reservoir to permit public access to the entire shoreline, except where it is in conflict with reservoir operations and management.
2. Relocation of all existing monuments, and additional markers to be erected to further explain the history of the inundated area.
3. Development of an access road to the shore from highway to boat docks, parking area, picnic tables, fire grates, toilets, and other facilities.
4. Minor tree planting for shade and beauty.

It is impossible to forsee every eventuality and to provide for every turn in events, but with the Bureau of Land Management, the National Park Service, the Bureau of Reclamation, the State Highway Department and Park Commission and Forest Service all working together, a dynamic system of recreation management can be evolved which will meet the needs of an ever changing, ever progressing society.

Wildlife

The demands on our wildlife and fish resources have increased tremendously in recent years. Wildlife values on public lands are carefully considered when the public domain is classified for disposal or management. Under the provisions of the Taylor Grazing Act, each District Advisory Board has one member who represents wildlife interests and is appointed by the Secretary of the Interior, on recommendation by the State Fish and Game Commission.

During the past few years the District Range Manager has had several meetings with the State Fish and Game Commission, the Forest Service, sportsmen's clubs and ranchers to solve disputes rising out of the game population and in planning wildlife management on the public lands.

When a herd of big game animals, such as elk or deer, overcrowds its range, and especially its wintering grounds, and no additional range can be made available, the only sensible thing to do is to reduce the herd by having annual kills. The areas on which hunting has been permitted have varied. The ratio of sexes authorized to be killed has been adjusted from year to year so as to maintain a balanced and healthy herd.

Indications are that the reduction programs do not go as far as the technicians have recommended, for fear that too many animals will be killed. This often results in further deterioration of the range and sometimes much starvation. The danger here is undercropping, not overcropping. Undercropping has occurred in the Wise River area and many others where the winter range for elk and deer is too small for the present number of the herd.

It is generally accepted that big game herds can not be "cropped" as scientifically as livestock herds, but the harvest can be efficient if the number of animals is kept in balance with the available food supply. There is no sense in reducing the big game herds if immediately thereafter enough cattle or sheep are placed on the range to more than offset the carrying capacity previously used by the big game. Also, reduction in livestock numbers should not be offset by increase in game numbers.

Public domain tracts along the rivers afford excellent access to the rivers in areas where "no trespassing" signs on deeded lands restrict the use of many miles of the river. While in some instances only a small area touches the river, it still affords access to the river for fishing and picnicking. The disposal of such lands is not considered to be in the public interest and would not lead to the highest use. During the area classification study, all areas suitable for multiple-use were classified as such. Table 11 gives the location of these multiple use areas.

The fishery values of the streams in the Upper Missouri River Basin are based on investigations and comparisons with other areas in which actual work was done by the State Fisheries to establish these values. The following letter, dated March 3, 1953, from the State of Montana Department of Fish and Game, Helena, Montana, explains the fishery value more thoroughly than can be done by anyone else:

> "Gentlemen:
>
> "The following report on the fishery values of streams in the Upper Missouri River Area, are submitted for your recognition and guidance in establishing recreational values for the Upper Missouri River Basin Project. The values per mile per year as stated are based on investigations and comparisons with other areas in which actual work was done to establish these values. The Montana Fish and Game Department as charged with the administration and protection of the wildlife interests, does not wish to make withdrawals of land at the present time, outside of their recognized game ranges and refuges. The land use for grazing and other economical uses may be continued if public access is guaranteed so that utilization of these wildlife resources by all people will be insured.
>
> "You will note by the valuations that they range from as low as $100 per stream miles per year to $20,000 per stream mile per year. This is recognized income from the use of these waters in Montana. In any of the public domain bordering on streams that have a valuation of $100 per mile to $20,000 per mile, we recommend that these lands be retained from sale and be continued to be administered by the Bureau of Public Lands, leased for economic use and right of access for public use be stipulated in such leases for the good of all people. From our evaluation you may spot your land holdings and determine such areas that should be retained from sale.
>
> "With regard to lakes, we do not have information available at the present time from field work that we may classify their value. We expect in the next year or two to be able to establish values on lakes and artificial impoundments for your guidance.

"In addition to the information furnished you in this transcript, we urgently request permission to evaluate each tract of land that is offered for sale in Montana. If we are advised of a proposed sale or an offering for sale, we will immediately make an appraisal and submit the information to your office within 30 days, or sooner if necessary, after the intention has been submitted to this office.

"Recognizing the values of recreation in terms of dollars is the only logical approach that we could submit. Please realize that the term 'value' as used herein recognized only fishermen expenditure. It is, in many respects, an inadequate figure, and because of the ommission from consideration of other values such as other forms of recreation, aesthetics, etc., it may be considered that our values are a minimum. Your cooperation in asking for our opinion is deeply appreciated and we are sure will be rewarded by the appreciation of the 200,000 fishermen and hunters who use the public lands in Montana.

MISSOURI RIVER DRAINAGE

Missouri River from Lake Sewell to Trident	$ 6,000
Sixteen Mile Creek from source to Ringling	$ 2,500
Battle Creek to source	$ 700
Crow Creek to source	$ 1,000

GALLATIN DRAINAGE # 1

Main Gallatin River from Trident to Manhattan	$ 5,000
West Gallatin River from Manhattan to Bozeman	$ 5,000
West Gallatin River from Bozeman to West Fork	$12,000
West Fork to Park Line	$10,000
East Gallatin River from Manhattan to Bozeman	$ 3,000
Dry Creek to source	$ 1,000
Reese Creek to source	$ 800
Bridger Creek to source	$ 1,000
Trail Creek to source	$ 800
Bear Creek to source	$ 200
Bozeman Creek to source	$ 1,000
Jackson Creek to source	$ 1,000

WEST GALLATIN

Cottonwood Creek to source	$ 500
Squaw Creek to source	$ 1,000
Swan Creek to source	$ 800
Portal Creek to source	$ 800
Buffalo Creek to source	$ 500

GALLATIN DRAINAGE # 2

Sage Creek to source	$ 200
Talar Fork to source	$ 1,000
Buck Creek to source	$ 100
Beaver Creek to source	$ 100
West Fork West Gallatin and tributaries	$ 700
Cascade Creek to source	$ 300
Hell Roaring Creek to source	$ 300
Spanish Creek to source and tributaries	$ 800

MADISON DRAINAGE

Madison River from Trident to Hot Springs Creek	$ 3,000
Madison River from Hot Springs Creek to Ennis Lake	$20,000
Madison River from Ennis Lake to West Fork	$16,000
Madison River from West Fork to Hebgen Lake	$ 14,000
Elk Creek to source	$ 100
Cherry Creek to source	$ 500
Bear Trap Creek to source	$ 500
Jordan Creek to source	$ 300
Jack Creek to source	$ 500
Cedar Creek to source	$ 100
Bear Creek to source	$ 500
Odell Creek to source	$ 5,000
Mill Creek to source	$ 0
Indian Creek to source	$ 500
Corral Creek to source	$ 300
Deer Creek to source	$ 0
Wolf Creek to source	$ 300
Moose Creek to source	$ 300
Squaw Creek to source	$ 300
Papoose Creek to source	$ 300
Sheep Creek to source	$ 300
Mile Creek to source	$ 300
Lake Creek to source	$ 1,000
West Fork Madison River to source	$ 1,000

Elk Creek to source	$ 1,000
Gazelle Creek	$ 300
Standard Creek to source	$ 1,500
Horse Creek to source	$ 500
Wall Creek to source	$ 500
Ruby Creek to source	$ 1,000
Wigwam Creek to source	$ 500
Blaine Spring Creek to source	$ 5,000
North Meadow Creek to source	$ 1,000
South Meadow Creek to source	$ 1,000
Hot Springs Creek to source	$ 1,000

JEFFERSON DRAINAGE

Jefferson River from Trident to Sappington Jct.	$ 3,000
Jefferson River from Sappington Jct. to Twin Bridges	$ 8,000
Willow Creek below dam	$ 3,000
Willow Creek above dam	$ 1,000
Norwegian Creek to source	$ 100
South Fork Willow Creek to source	$ 1,000
North Fork Willow Creek to source	$ 1,000
South Boulder Creek to source	$ 300
Whitetail Creek to source	$ 100
Pipestone Creek to source	$ 200
Little Pipestone Creek to source	$ 100
Fish Creek to source	$ 300

BOULDER RIVER DRAINAGE

Boulder River from Finn to mouth	$ 100
Boulder River from Finn to Elk Park	$ 500
Elkhorn Creek to source	$ 50
Muskrat Creek to source	$ 300
Cataract Creek to source	$ 300
Basin Creek to source	$ 300
Red Rock Creek to source	$ 300
Bison Creek to source	$ 500
Little Boulder River to source	$ 200
Little Whitetail Creek to source	$ 100

BEAVERHEAD DRAINAGE

Beaverhead River from Twin Bridges to Dillon	$ 4,000
Beaverhead River from Dillon to Grasshopper Creek	$ 8,000

Beaver River from Grasshopper Creek to Armstead	$12,000
McHessor Creek to source	$ 100
Stone Creek to source	$ 300
Carter Creek to source	$ 300
Blacktail Creek to source	$ 2,000
East Fork Blacktail Creek to source	$ 1,000
West Fork Blacktail Creek to source	$ 1,500
Middle Fork Blacktail Creek to source	$ 500
Teddy Creek to source	$ 100
Cottonwood Creek to source	$ 100
Sheep Creek to source	$ 100
Grasshopper Creek to source	$ 1,000
Taylor Creek to source	$ 200
Buffalo Creek to source	$ 300
Reservoir Creek to source	$ 100
Rattlesnake Creek to source	$ 500

RUBY RIVER

Ruby River from mouth to reservoir	$ 6,000
Ruby River from Reservoir to source	$ 2,000
Wisconsin Creek to source	$ 300
Indian Creek to source	$ 300
Mill Creek to source	$ 300
Ramshorn Creek to source	$ 0
Wakefield Creek to source	$ 0
Alder Creek to source	$ 1,500
Barton Gulch to source	$ 500
Greenhorn Gulch to source	$ 300
Warm Springs Creek to source	$ 1,000
Ledford Creek to source	$ 600
Robb Creek to source	$ 200
Sweetwater Creek to source	$ 500

RED ROCK RIVER DRAINAGE

Red Rock River from Armstead to Dell	$11,000
Red Rock River from Dell to Lima Reservoir	$ 4,000
Red Rock River from Lima Reservoir to Lower Red Rock Lake	$ 0
Red Rock River from Lower Red Rock Lake to source	$ 3,000
Big Sheep Creek, lower three miles	$ 0
Big Sheep Creek, up to spring	$ 6,000
Muddy Creek to source	$ 300

Cabin Creek to source	$ 200
Crystal Creek to source	$ 200
Rock Creek to source	$ 200
Nicholia Creek to source	$ 600
Deadman Creek to source	$ 300
Little Sheep Creek to source of all forks	$ 400
Sawmill Creek to source	$ 200
Beaver Creek to source	$ 200
Shinberger Creek to source	$ 200
Swamp Creek to source	$ 200
Odell Creek to source	$ 3,000
Elk Creek to source	$ 4,000
Metzel Creek to source	$ 100
Long Creek to source	$ 400
Middle Creek to source	$ 300
Clover Creek to source	$ 100
Basin Creek to source	$ 400
Long Creek to source	$ 600
Sage Creek from the mouth to Basin Creek	$ 0
Sage Creek from Basin Creek to source	$ 1,000
Divide Creek to source	$ 400

Spring located in T. 14 S., R. 10 W., Sec. 15 and 22. Spring on Big Sheep Creek is especially important.

HORSE PRAIRIE DRAINAGE

Horse Prairie Creek from mouth to Coyote Creek	$ 1,000
Horse Prairie Creek from Coyote Creek to source	$ 600
Bloody Dick Creek to source	$ 1,000
Trail Creek to source	$ 500
Emerson Creek to source	$ 200
Black Canyon Creek to source	$ 200
Medicine Lodge Creek and all tributaries to source	$ 400

BIG HOLE RIVER DRAINAGE

Big Hole River from Twin Bridges to Divide	$18,000
Big Hole River from Divide to Pintlar Creek	$14,000
Big Hole River from Pintlar Creek to source	$ 6,000
Camp Creek to source	$ 100
Moose Creek to source	$ 200
Divide Creek to source	$ 1,000
Jerry Creek to source	$ 200
Deep Creek drainage	$ 500
Seymour Creek to source	$ 300

La Marche Creek to source	$	400
Fishtrap Creek to source	$	400
Mud Creek to source	$	400
Pintlar Creek to source	$	500
Tributaries of Big Hole River above Pintlar Creek	$	800
North Fork Big Hole River to source	$	1,000
Bull Creek to source	$	100
Warm Springs Creek to source	$	1,000
Stanley Creek to source	$	100
Francis Creek to source	$	100
Steel Creek to source	$	600
Doolittle Creek to source	$	400
McVay Creek to source	$	100
Squaw Creek to source	$	500
Bryant Creek to source	$	300
Alder Creek to source	$	100
Wise River to source	$	1,000
Pattengail Creek to source	$	600
Lacy Creek to source	$	500
Mono Creek and those above on Wise River	$	800
Canyon Creek to source	$	2,000
Trapper Creek to source	$	800
Cherry Creek to source	$	800
Rock Creek to source	$	800
Willow Creek to source	$	200
Birch Creek to source	$	200

"Very truly yours,
Walter M. Allen
(Sgd.) by C. G. BISHOP
WALTER M. ALLEN
SUPT. STATE FISHERIES "

The State Fish and Game Department has suggested that the public domain in several areas vital for studies in the transplanting of mountain sheep, waterfowl and beaver, as well as elk plants, remain in federal ownership. These areas are as follows: The Blacktail drainage for a five year detailed beaver study started in the spring of 1953 (public ownership is vital for the continuance of this study); the area in and around the mouth of Sixteen Mile Creek near Lombard, Montana, which has been proposed for a planting site for mountain sheep and the area around the Lima Reservoir for waterfowl studies as well as muskrat values. The Upper Centennial Valley should, also, be considered as an area for planting mountain goats. It has also been suggested that the Ruby Mountains be considered for an elk plant and hunting ground.

This area should have further study as to its value for such a project before any definite plans are made.

The Game Department has indicated that the fur industry has a very important bearing on the economy of the basin. The scattered tracts of public domain in the Big Hole River drainage, as well as some of the other drainages that are covered with willow stringers and swamps, are important for fur bearing animals. These areas have a high potential for beaver, mink and muskrat trapping. Therefore, it is essential that these tracts be retained in some kind of public ownership to provide for access by the general public for the proper harvest of the wildlife resources of the area.

These wildlife areas are outlined on the proposed adjustment map 17/ and are named and numbered according to the following list.

WILDLIFE VALUES - UPPER MISSOURI RIVER BASIN 18/

1. Warm Springs Area
   This is winter range for around 100 head of elk. It is the principal range for elk in the Upper Bighole. Could carry 300 head. Approximately 25 moose winter here. (Rare big game animal).

2. Swamp Creek
   This has a high potential for beaver and muskrat trapping and will be important when trapping districts are created. This is a very good moose winter range and is frequented by many moose hunters. Hunter success was higher in this area than any other in the Bighole.

3. Western Bighole
   These scattered tracts are covered with willow stringers and streams and are the principal winter range for the Bighole moose. Fur raising is very important.

4. Wisdom-Ralston (East side Bighole)
   Primarily winter elk range. A problem area exists here requiring special extended hunting and public access is vital to its success. Elk winter in small groups all the way from Steele Creek to LaMarche Creek.

17/ This map is furnished with copies numbered 1 to 15, inc. of this report.

18/ Montana State Fish and Game Department Wildlife Values, Mar. 1954.

5. Deep Creek

Extensive elk and deer migration routes come through this area. This is also important moose winter range.

6. Wise River Area

Approximately 2,000 deer winter throughout this area. This is the principal winter range for the Bighole River Deer Herd. It is extremely important and represents a problem area. Range conditions are critical. In light of possible acquisition of winter elk range from private individuals east of Glacier Mountain, the public domain in the vicinity of Leffler and Charcoal Creeks would have increasing value as elk winter range.

Application has already been made for some of this public land north of Divide, but this is only a small portion of the main big game range. The public lands lying in the Wise River area are the key to the success of this winter range. Mink, muskrat and beaver are also very important and access is necessary for proper harvest.

7. Birch Creek - Canyon Creek Area

Primarily mule deer winter range (1200 - 1500 head) with several very good elk winter range areas. This is an area of elk transplanting (1952-53). Public domain in vicinity of Canyon and Trapper Creeks is vital winter range for a segment of the Bighole elk herd. Without this small area the Bighole elk herd would be in danger of being reduced 250 to 300 head. Also, mountain goats winter and summer both in this vicinity on public lands and their aesthetic value and hunting access are quite important. Any reduction of mountain goats in this area would jeopardize our trapping operations in this area for transplanting purposes. This is one of our principal trapping sites. That portion of the area south of Lost Creek is the year round range for approximately 100 head of antelope. Approximately 80 elk winter in the area immediately south of Birch Creek.

8. Rochester Basin

This is one of the principal winter ranges for the Highland Mountain elk herd and has a high potential for mule deer. This is year round range for approximately 150 head of antelope.

9. McCartney Mountain

This is an area where a cooperative agreement on management has been inaugurated between interested parties. (Sportsmen and ranchers) Elk were transplanted to this area in 1951-52 and there are approximately 55 head there now.

10. Nez Perce Creek

Winter range for approximately 150 antelope. These were planted in 1948.

11. Block Mountain (south of Bighole)

This area is the site of release of chukar partridges and they have adapted themselves to wintering there. Some transplanted antelope have located south of the Bighole and there are several hundred mule deer wintering on the Mount Mahogany sidehills there.

12. Beaverhead Rock

About 100 antelope have moved into this area from a transplant farther west. A warm spring swamp is the best muskrat producer in the area. Also excellent waterfowl habitat.

13. Lower Grasshopper

Antelope range, these were transplanted here, are thriving.

14. Scudder Creek

This is a critical winter concentration area for the deer out of the south end of the Pioneer Mountain Range. At present there are many deer and the competition with the domestic stock is excessive. Due to range depletion, intensive research by the State Fish and Game Department is being carried on and is planned for a long term study. Cooperative agreements could result in mutual benefits for the lessees', the B. L. M. and the Fish and Game Department.

15. Upper Horse Prairie

Increasing numbers of elk winter in the Painter Creek-Coyote Creek area. There are 100 elk, 350 mule deer and it is good moose winter range.

16. Lower Medicine Lodge

Antelope year round range (200).

17. Medicine Lodge

Quite vital elk winter range due to relationship to Idaho. Very critical deer winter range. 150 elk and 600 mule deer, moose winter range. Elk stay on the west side year round. Beaver are quite important in this drainage.

18. Muddy Creek

Elk and mule deer range here year round.

19. Sheep Creek Basin

Important also because of the relationship to Idaho antelope herds. Important antelope hunting area. Best sage grouse area in country. For this reason, access is extremely important.

20. Lower Sheep Creek

Mule deer winter range.

21. Little Sheep-Poison Creek

450 elk winter on this range, plus some deer. Also, a potential transplanting site for mountain sheep.

22. Centennial Mountains (South of Refuge)

Elk winter range.

23. North of Refuge

Elk and antelope winter range.

24. Wolverine Basin

Elk winter range (50).

25. Lima Reservoir

High waterfowl, mink and muskrat values. The Reservoir is becoming important for trumpeter swan.

26. Sage Creek Basin

Antelope (750) range - most import in unit. Tagging studies, conducted in this drainage recently, indicate that this is a winter concentration area for antelope from the Centennial Valley and the Blacktail and Ruby River areas.

27. Clark Canyon - Blacktail Ridge

Primarily elk (400) range - both winter and summer. That portion on Blacktail Creek is in proposed beaver study area.

28. Snowcrest Mountains

Elk winter range (900). This is very vital game range. Principal elk winter range for the Snowcrest Mountain - Gravely Range elk herds. This area is particularly vital as the elk have a natural tendency to winter in the more flat terrain.

29. Blacktail - Sweetwater Ridge

Antelope year round range. (350). A 5-year detailed beaver study is proposed by the State in this area and public ownership is vital for this study.

30. Sweetwater

Antelope range (200).

31. Ruby Mountains

Deer and antelope range. There is a high potential for elk here. Particularly important from the standpoint of put and take elk management.

32. Tobacco Root Mountains (West side)

Mule deer winter range. North end of this area in particular is important as antelope range. Potential transplanting site for mountain sheep and goats. Mule deer winter range particularly vital in Wisconsin Mill Creek area.

33. Tobacco Root Mountains (East side)

Mule deer and elk winter range. Mountain sheep range in Willow Creek area.

34. Silver Star

Antelope range (60). This herd was transplanted by the State.

35. Whitetail-Bull Mountain

Primarily elk range with considerably higher potential for both elk and mule deer. Due to possible land acquisition of elk winter range this area will probably become a more important elk area.

36. Boulder Area

Deer (500) and elk (100) winter range.

37. Johnny's Gulch

This area supports the largest elk herd within the

Elkhorn Unit of the Helena National Forest. Approximately 150 elk winter in this area.

38. Limestone Hills

Very important mule deer herd wintering here (2000). It is also a chukar partridge transplant area. Access is vital towards management here as range is critical.

39. Winston Flats

Five hundred antelope spend year on both sides of the highway. Aesthetically this herd is of national acclaim, and could be lost if range were privately owned.

40. Spokane Hills

A very good wintering herd of mule deer on west side of Lake Sewell. Adjoins new Canyon Ferry Reservoir, which is now under the administration of the State Fish and Game Department.

41. Confederate Gulch

Good mule deer wintering area (500), and is also a potentially good elk range.

42. Deep Creek

Mule deer wintering area - critical use. Also, vital elk wintering area.

43. Horseshoe Hills

Very good mule deer winter range. Elk transplanted there in 1950 and doing well. Adjoins mountain sheep transplant site on Sixteen Mile Creek.

44. Lombard

Proposed planting site for mountain sheep. This is also an important elk wintering area (200).

45. North Bridger Mountains

Elk winter range. Elk have been planted here.

46. Reese - Ross Creek

Critical mule deer winter range.

47. Lewis and Clark Cavern

Mule deer were planted here and are doing well. Excellent habitat. This is also a potential mountain sheep planting site.

48. Bear Creek

Small area within critical winter elk range. This is included in an approved acquisition project for game range and withdrawal for wildlife purposes is proposed.

The Montana Fish and Game Department makes all planting of big game on public domain. Before such plantings are made they should have the cooperation of all users of the range for the area that they intend to restock. The stocking of all streams and lakes is done by the Fish and Game Department with the assistance and cooperation of the ranchers, Forest Service and the Bureau of Land Management.

The State Fish and Game Department has recommended several small exclosures on Federal range in areas where there has been a large concentration of deer. These exclosures would be used to study the effects of game animals on the range. Locations of the proposed exclosures are to be: the NE$\frac{1}{4}$NE$\frac{1}{4}$, Section 20, T. 6 S., R. 12 W., and the NW$\frac{1}{4}$, Section 18, T. 4 S., R. 9 W.; there will be two exclosures located in each tract. It will be interesting to observe future developments on these small exclosures where grazing of all animals are excluded.

PROBLEMS RELATING TO THE PUBLIC DOMAIN IN THE MANAGEMENT UNIT

Range Problems

Problem 1. Seasonal unbalanced use of available forage.

One of the major problems confronting the administrator of public domain in this area is the seasonal imbalance of available range. There is a tendency among the operators in this area to turn their livestock out of their winter pastures and feed lots onto the range too early in the spring. This situation has led to improper seasonal use and severe overuse of spring and summer range. This early use is at a critical growth period, since the plants are using food reserves stored in the roots for their initial growth. If the foliage is utilized heavily at this period the plant has little opportunity to replace this reserve food supply. They, therefore, become weakened and more susceptible to adverse weather conditions and competition from unpalatable plants. This unseasonal use of range has caused many of the palatable grasses to be replaced by less desirable plants, such as sagebrush and other forbs and weeds.

Studies conducted for this report indicate that there are 1,555,344 aum's required for spring, summer and fall range in the study area of the Upper Missouri Basin. The available range feed for these three seasons is 1,407,934 aum's. Comparison of these two figures indicates that a total of 147,410 animal unit months more of forage is needed during these three seasons of use. Tables 7 and 8 show, by seasons, the type and source of available forage for the study area.

There are two solutions for this problem of seasonal imbalance of range:

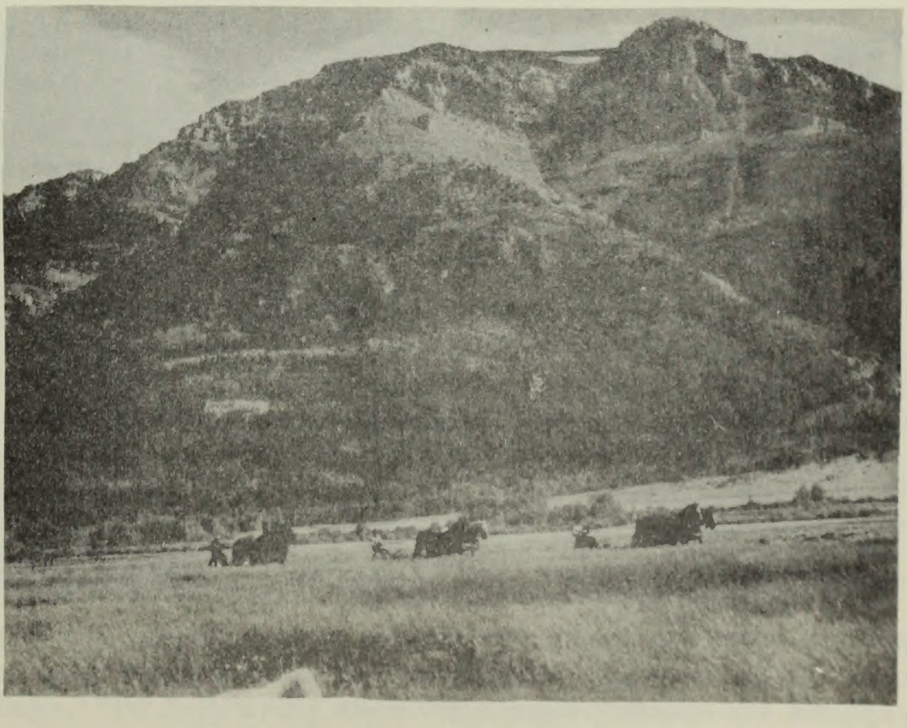
The development of pastures, irrigated where feasible, of cool season exotic grasses and legumes, is highly recommended to partially solve this problem. These pastures would furnish several weeks of spring and fall grazing thereby giving the summer range an opportunity to make sufficient growth to withstand grazing. The production of hay meadows along creek bottoms that are now yielding low tonnages of hay could be increased considerable by planting improved grasses and by improving the irrigation methods. A few ranchers in the Big Hole River area increased production of their better hay meadows from three-fourths of a ton per acre to two tons per acre by these methods. This released some of their low quality meadows for use as pastures, and relieved the necessity of turning their stock onto range before the grasses have made sufficient growth to withstand grazing. Photograph No. 8 shows a good hay meadow which is typical of what could be accomplished on a number of the areas now producing low yields of hay. Good soils on benchlands, especially where flood or waste waters can be spread, are excellent sites for pasture development. Land supporting good stands of sagebrush will produce good tame pasture of adaptable exotics under proper management. There are areas of this type in nearly every drainage of the basin that could be used to produce spring and fall pastures. These pastures would be used in the spring and again for a few weeks in the fall before going into the hay meadows for winter grazing. The most suitable sites for these pastures are largely in private ownership so it is up to private individuals to carry out this phase of the range improvement program.

The second solution to this problem of seasonal imbalance range use is to improve the existing ranges. This should be done on private and State lands as well as on public domain lands. Such a program would be carried out by the Bureau of Land Management on public domain, the Soil Conservation Service and the Production and Marketing Association, along with the landowners and operators on State and private lands. Suggested improvements are reseeding depleted areas, sagebrush erradication, waterspreading and contour furrowing. Each of these will be discussed in later sections of this report, therefore, are only mentioned here.

Problem 2. Range Deterioration

Much of the land is capable of supporting forage plants of superior quality and greater quantity if the competition of the sage is removed and the abuse from overgrazing is curtailed. It is difficult for livestock to graze land with heavy sagebrush cover since the sagebrush prevents proper utilization of the understory of palatable grasses. On such areas the amount of land required to furnish an animal unit month of forage is large and the returns per acre are small.

The forage production on sagebrush land is far below what it is capable of producing, but it can be increased by reduction of the sage. The Dubois Experiment Station has succeeded in raising the carrying capacity of several thousand acres of land by eradicating the sagebrush by burning. After treatment of this land by the above method the forage production increased about 150 percent.



Photograph No. 8 - A good hay meadow which is typical of what could be accomplished on a number of the areas now producing low yields of hay.

Photograph No. 9- Forest Service Vigilante Experiment Station sagebrush removal by roto-beater. Area on right cleared in 1952.

Photograph No. 10- Heavy sagebrush area two years after being cleared with a roto-beater.

The Vigilante Experiment Station of the Forest Service, located on the Upper Ruby River drainage, has been experimenting with the roto-beater type of sagebrush eradication for the past three years or more. This type of machine actually chews the sagebrush into shreads and spreads it over the ground. This mulching effect aids in the control of runoff and erosion and protects the grass seed during the sprouting period. They have found this method to be highly successful. This machine can be used only on areas free of rocks. Photographs No. 9 and 10 show areas before and after sagebrush has been removed by this method.

A few of the livestock operators have been improving the range not only on this own land, but on lands that they have under lease, which is mostly public domain. They have improved their range by removing the sagebrush by burning, grubbing and disking, thereby, increasing the production of the palatable grasses.

This Bureau's land classification study reveals that sagebrush eradication is desirable on approximately 23,000 acres of public domain in the study area. Areas in need of sagebrush eradication are delineated on the land classification map of this report.

After treatment these lands should be protected from grazing for at least one year, and rodents should be eradicated if they appear to be causing any damage. Deferred rotation grazing should then be practiced, to give the grasses a chance to recover from competition with sagebrush for water and plant food. Photograph No. 11 shows a typical sagebrush type that would respond to this treatment.

Problem 3. Faulty Distribution of Livestock

The distribution of livestock on the range is dependent upon adequate and properly located water, quality of the forage, location of salting grounds, proper fencing and topography. On much of the area cattle tend to stay in the creek bottoms close to water, and as a result relatively abundant grass occurring at the higher elevation is not utilized.

It is the responsibility of both the ranch operator and the Bureau of Land Management to improve the distribution of livestock on the range. To help bring about this improvement the ranch operator should place salting grounds in the under utilized areas of his range in order to draw the stock to areas remote from water.

During the detailed investigations it was recommended that 22 springs be developed and 33 wells and windmills be placed on the range to bring about a more even utilization of the area. The location of these proposed improvements is shown on the land classification map and a summary of their costs and benefits is given in Table 13.

Problem 4. Poisonous Plants

Poisonous plants are not a serious problem in this basin as yet. However, a few areas of infestation are of considerable size and significance. The best solution to such a problem is through improved range management practices. Infestations of poisonous plants that can not be controlled by these methods, should be treated by herbicides. Areas of poisonous plants needing treatment are indicated on the land classification map of this report.

Problem 5. Insect Control

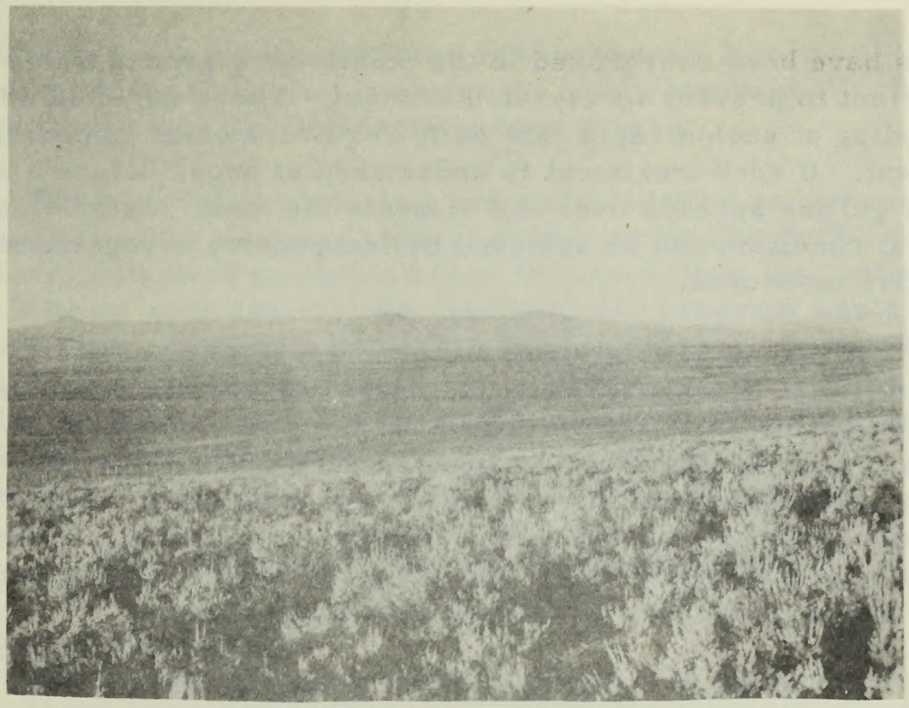
Insects cost the residents of the basin considerable amounts of money, annually, in loss of crops and livestock profits or in expenditures for their control. During the summers of 1951 and 1952 grasshoppers infested the Dell and Lima areas and destroyed most of the fall range. Adequate control methods have been developed by the Bureau of Entomology. The District Range Manager and residents of the area should be alert to this problem and report infestations in order that control measures can be applied in time to prevent damage.

Watershed Problems

The watersheds of the basin are multiple-use lands, yielding a wide variety of products. Since a stable soil is basic to them all, the primary objective in land management is to maintain and improve those soils that are stable and to stabilize those that are now eroding.

Watersheds, when managed properly permit the year-round use of water as needed. Poor watershed management may result in too much run-off at one time in the form of damaging floods in the spring from melting snow or during heavy rains, and a shortage of water in the late summer when it may be sorely needed by the ranchers and farmers.

The mountainous areas have fair to good ground cover and present few if any problems, but some of the lower slopes and



Photograph No. 11- A typical sagebrush type that would respond to this treatment of eradication by any of the methods on record.

Photograph No. 12- Public domain which has been properly used.

benches have been overgrazed to the point where ground cover is insufficient to prevent accelerated erosion. These depleted areas are eroding at such a rapid rate as to require special remedial treatment. If such treatment is undertaken at once, before a network of gullies spreads over and dissects the land, restoration to a natural condition can be achieved by inexpensive revegetation and protective measures.

The principal solution to the problem of watershed impairment is the application of sound range management and conservation practices, over the entire area, by the livestock operators and all others who utilize and administer the area. Land use should be carefully adapted to the capabilities of the land. Accelerated wind and water erosion can be most economically controlled by maintaining suitable plant cover. Photograph No. 12 shows public land which has been properly used.

The run-off in drainages can be greatly retarded, and in small drainages may be prevented, by contour furrowing on rangelands that are susceptible to this type of treatment. Lands where this type of treatment is contemplated should have relatively smooth slopes of not over 15 percent. In this basin there are only a few areas that are suitable for this type of erosion control. The forage production is often doubled after contour furrowing. Experiences in other basins with these types of treatment indicate that such measures will be amply justified in this basin.

The proposed waterspreaders will retard run-off and spread water over a greater area instead of letting it be concentrated in the draws. This method of erosion control can be used only on slopes of less than two percent. The on-site benefits derived from such structures are percolation of water into the soil, greater production of palatable forage and the prevention of soil erosion. The forage production may be increased 250 to 500 percent by these waterspreaders. This has been demonstrated in the Alzada waterspreading project and in other parts of Montana and Wyoming.

Detention dams are proposed wherever conditions warrant and suitable sites could be found. In some areas where they could be of benefit it was found that the geological formation made such structures impracticable. Construction of these proposed detention dams will facilitate the establishment of vegetation below the reservoirs, by stabilizing the gullies and permit the planting of trees and grasses. More check dams, for retarding the run-off than detention dams were proposed in this basin. It was felt that check dams placed high in the drainages would be more effective than the larger dams placed farther down stream.

This watershed protection and rehabilitation program must be accompanied by adequate control of the use by livestock, and if necessary, complete exclusion of the livestock from the treated area. Without such control, the improvement program would be retarded if not completely useless. The locations of proposed improvements are shown on the land classification map in the appendix and Table 13 gives, in tabular form, the proposed improvements, with construction costs, maintenance costs, on-site and off-site benefits, and other miscellaneous data.

LAND USE PROBLEMS AND ADJUSTMENTS

Land Ownership Pattern

There are many isolated and disconnected tracts of public domain scattered throughout the basin. Where these tracts were found to have no significant public use values and contributed to no public problems they were classified as suitable for disposal by exchange or public sale. But of course not all public domain, which includes some of the isolated tracts, is suited for disposal under present economic conditions. Some areas such as badlands, heavily eroded lands and others are so unproductive that if brought under private ownership they would place a hardship on the owner, as returns from such areas are very small.

The present policy of the Bureau of Land Management in providing proper management of the remaining public domain is to provide for the highest use of these lands for the greatest number of people. The public lands in this basin have been classified and a thorough analysis has been made of their highest uses; lands that are not needed in Bureau of Land Management programs will be offered, first, to other Federal agencies and then to the State for their administration under public programs. Then, the needs of counties, cities and towns will be considered and finally, lands not suited for public use will be offered to private individuals or corporations by sale or exchange.

A land adjustment program should be initiated, whereby public domain lands that are suitable for watershed and timber production and adjoin National Forests be administered in conjunction therewith. Areas so situated are delineated on the land adjustment map, 19/, and the following tabulation gives the summary of the lands so classified:

Township	Range	Section	Acreage for Township
10 N.	2 E.	26, 27, 34, 35	1, 560
7 N.	3 W.	28, 29, 30 ~~20~~, 31 ~~21~~, 32, 33	2, 479
7 N.	4 W.	31, 32, 33	616
7 N.	5 W.	34, 35, 36	1, 214
6 N.	4 W.	5, 6, 7, 18, 19	1, 887
6 N.	5 W.	1, 2, 3, 9, 10, 11, 12, 13, 14, 15, 16, 17, 22, 23, 24, 25	6, 909
5 N.	5 E.	2	640
5 N.	4 W.	5, 6, 8	1, 196
4 N.	6 W.	6	216
4 N.	7 W.	2, 11, 14, 21, 22, 25, 27, 28, 33, 34	1, 960
3 N.	5 E.	4, 9, 15	1, 600
3 N.	7 W.	2, 3, 4, 11, 12, 13, 14, 23, 24, 26	1, 800
2 N.	5 E.	14, 24, 25	735
2 N.	6 E.	29, 30, 31, 32, 33	603
2 N.	13 W.	34	160
1 N.	6 E.	5, 6, 31	165
1 N.	7 E.	20	160
1 N.	8 W.	31	640
1 N.	10 W.	30, 31, 32	873
1 N.	11 W.	13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 35	8, 237
1 N.	12 W.	2, 3, 4, 10, 11, 12, 13, 14, 15, 23, 24	4, 735
1 N.	15 W.	28	160
1 S.	6 E.	4, 5, 9, 21, 34	1, 439
1 S.	8 W.	4, 5, 6, 7, 8, 9, 10, 17, 18, 19, 20	5, 491
1 S.	9 W.	1, 2, 11, 12, 13, 14, 23, 24	4, 498
1 S.	10 W.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	7, 337
1 S.	11 W.	1, 5, 6, 7, 8, 17, 18	1, 728
1 S.	14 W.	4	641
1 S.	16 W.	10, 17, 18	400
2 S.	8 E.	6	285
2 S.	16 W.	7	80
3 S.	1 E.	34, 35 (East of River)	828
3 S.	2 W.	10, 15, 22, 27, 34	2, 640

19/ This map is furnished with copies number 1 to 15, inc. of this report.

Township	Range	Section	Acreage for Township
3 S.	17 W.	14, 23, 24, 26	1,080
4 S.	1 E.	8, 17, 20 (East of River)	840
4 S.	2 E.	22, 26	877
4 S.	3 E.	20, 24, 28	320
4 S.	4 E.	2, 6, 8	440
4 S.	2 W.	34	160
4 S.	15 W.	25	160
4 S.	16 W.	17, 18, 19, 20, 28, 29, 33	2,360
5 S.	2 W.	2, 3, 10, 17, 20, 21	2,282
5 S.	12 W.	7	240
5 S.	14 W.	21	280
5 S.	16 W.	4	200
6 S,	13 W.	4	240
6 S.	15 W.	29	80
6 S.	16 W.	1	120
7 S.	3 W.	7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26	9,499
7 S.	4 W.	13, 23, 24, 25, 26	2,623
8 S.	2 W.	12	120
8 S.	4 W.	1, 2, 11, 12, 13, 14, 23, 24, 25	4,653
9 S.	1 E.	14	397
9 S.	15 W.	23, 26, 35	1,200
10 S.	15 W.	2, 3, 10, 11, 34, 35	2,888
10 S.	1 E.	31, 32, 33, 12	1,322
10 S.	1 W.	25	80
11 S.	2 E.	20	200
11 S.	5 W.	13, 24, 25, 26, 32, 33, 34, 35	4,080
11 S.	12 W.	6, 8, 17	1,313
11 S.	13 W.	1, 2, 3	1,536
11 S.	14 W.	6, 7, 18, 19	2,548
12 S.	12 W.	15, 22, 27	1,760
		TOTAL	107,810

The above listed public domain lands should be exchanged for National Forest lands that are principally suited for watershed and grazing use. Areas that are suggested for Bureau of Land Management supervision are delineated on the adjustment map 20/, and the following tabulation gives the summary of lands so classified:

20/ This map is furnished with copies number 1 to 15, inc., of this report.

Township	Range	Section	Acreage for Township
6 S.	11 W.	28, 33	1, 280
7 S.	11 W.	3, 4, 9, 10	2, 618
11 S.	10 W.	29, 30, 31, 32	2, 585
11 S.	11 W.	25, 34, 35, 36	2, 560
12 S.	10 W.	5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 27, 28, 33, 34, 35	10, 212
12 S.	11 W.	1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35	19, 151
12 S.	12 W.	36	640
13 S.	10 W.	1, 2, 3, 4, 10, 11, 12, 13, 14, 23, 24	6, 748
13 S.	11 W.	3, 4, 5, 6, 8, 9, 10, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36	16, 128
13 S.	12 W.	1	676
14 S.	10 W.	6, 7, 16, 17, 18, 19, 20, 21, 28, 29, 30	6, 995
14 S.	11 W.	1, 2, 3, 11, 12, 13, 14, 24	5, 118
		TOTAL	74, 111

An exchange program should be initiated whereby public domain and State lands would be exchanged to facilitate management and supervision of both administrative agencies. The following lands are best suited for management under State programs:

Township	Range	Section	Acreage for Township
7 N.	5 E.	2, 13	160
7 N.	6 E.	17, 18, 21, 22	360
6 N.	6 E.	2, 10, 28	600
6 N.	7 E.	10	480
5 N.	6 E.	8	120
4 N.	1 E.	5, 6, 7, 8	882
4 N.	2 E.	26, 34	960
4 N.	3 W.	26	80
3 N.	2 E.	4, 6, 10, 19, 20, 30	2, 925
3 N.	4 E.	6, 8	920
3 N.	1 E.	12, 25, 26	997
3 N.	2 W.	8	160

Township	Range	Section	Acreage for Township
3 N.	3 W.	2, 4, 14, 22, 24, 26, 34	1, 480
2 N.	2 W.	4	160
1 N.	1 W.	18	240
1 N.	2 W.	12, 13, 14, 26, 30	2, 880
1 N.	3 W.	1, 13, 24	800
1 N.	4 W.	34	160
1 N.	9 W.	4	240
1 S.	3 W.	14, 28	200
1 S.	15 W.	10, 15	160
2 S.	14 W.	31	320
2 S.	16 W.	3, 7	120
2 S.	15 W.	10, 15, 22, 27	1, 400
3 S.	15 W.	25	40
4 S.	6 W.	26, 34	240
4 S.	16 W.	21	200
5 S.	5 W.	18	320
5 S.	6 W.	2, 6	120
5 S.	7 W.	35	320
5 S.	14 W.	20, 21, 30, 32	440
6 S.	6 W.	30	320
		TOTAL	18, 804

The following State lands are best suited for management under Federal programs:

Township	Range	Section	Acreage for Township
7 N.	1 W.	36	640
6 N.	1 E.	16, 36	1, 280
2 N.	6 W.	36	640
1 S.	9 W.	36	640
1 S.	8 W.	36	640
2 S.	6 W.	16	640
2 S.	8 W.	16, 36	1, 280
4 S.	8 W.	16	640
6 S.	3 W.	36	640
6 S.	5 W.	16	640
6 S.	6 W.	36	640
6 S.	10 W.	16, 36	1, 280
6 S.	12 W.	16	640
7 S.	4 W.	36	640
7 S.	10 W.	16	640
7 S.	11 W.	16, 36	1, 280

Township	Range	Section	Acreage for Township
8 S.	10 W.	16	640
8 S.	11 W.	16, 36	1, 280
8 S.	12 W.	16	640
8 S.	13 W.	36	640
9 S.	8 W.	32	640
10 S.	6 W.	16, 21, 28, 33	2, 480
11 S.	6 W.	4	320
11 S.	11 W.	22, 26, 27	1, 320
12 S.	6 W.	16, 21, 27, 26, 36	1, 600
13 S.	6 W.	15, 16, 17, 19	960
13 S.	7 W.	1, 2, 3, 4, 9, 10, 23, 24, 29	1, 680
		TOTAL	25, 000

Stock Driveways

The stock driveway withdrawals in this basin are as follows: Alder Creek, Stone Creek, Rattlesnake Creek, Sweetwater Creek, Blacktail Creek, Sage and Basin Creek, Muddy Creek, Sheep Creek Stocktrails (outside district) and Horse Prairie Stocktrail (within district). The history of these stock driveways has been that operators considered these trails as free range and have used them along with their private range. Parts of the trails are picked clean by trespassers before the first legitimate trail herd arrives on the trail.

A readjustment in operations has brought about a vast change in the use of nearly all stock trails now in existence. Many of the operators truck their livestock to and from summer range due to less shrinkage in weight and also because of shortage of feed on some of the trails.

Six of these stock trails will continue to be of importance to the livestock industry. These six driveways will be discussed separately, giving their use, adjustments and improvements needed to better utilize these withdrawals.

The Alder Creek Stock Driveway is the main artery for trailing of livestock from Sheridan and Virginia City areas to summer grazing on the Beaverhead National Forest and the Centennial Valley.

There are sixteen operators, both sheep and cattle, who utilize this driveway. These operators trail herds of various sizes with the total number of livestock traversing the driveway being approximately 700 cattle and 16,000 sheep. The time of use is the latter part of June and early July, and in the latter part of September. The period of use covers about ten days at these two periods of the year with the average length of time on the driveway being two days.

The condition of the vegetation ranges from excellent, in the central and southern portions of the driveway, to a high-fair condition in the northern portion. An abundance of water for stock is found on the driveway in the form of the Axolotl Lakes, Buffalo and Alder Creeks.

Adjustments necessary to provide continuous and a usable trail will be the withdrawal of approximately 400 acres of public domain and the acquisition of about 640 acres of private and State lands through exchanges or purchases.

The following is a list of lands now vacant and under Section 15 lease, which should be withdrawn and added to this driveway:

T. 7 S., R. 2 W., Section 5, SE¼SW¼
T. 7 S., R. 3 W., Section 1, N½, NE¼SE¼

Private or State lands needed for trailing purposes, which should be acquired by exchange under Section 8 of the Taylor Grazing Act are as follows:

T. 6 S., R. 3 W., Section 36, SW¼ - State
Section 27, NE¼ - Private

There are several disconnected and adjacent lands now withdrawn for stock driveway, which are not needed for this purpose. These isolated pieces, as well as a few adjacent lands, are now being leased under Section 15 of the Taylor Grazing Act and are no longer used for the purpose withdrawn. The following withdrawals should be revoked and restored to public domain status:

T. 6 S., R. 3 W., Section 1, W½
Section 2, E½
Section 8, NE¼SE¼, S½S½SE¼NE¼,
E½SE¼SE¼, N½NW¼SE¼SE¼
Section 9, Lots 3, 8, 9, 10, SW¼NW¼,
S½SW¼, NE¼NE¼, NW¼SW¼

T. 6 S., R. 3 W., Section 18, SW$\frac{1}{4}$, W$\frac{1}{2}$NW$\frac{1}{4}$, N$\frac{1}{2}$SE$\frac{1}{4}$, SE$\frac{1}{4}$NW$\frac{1}{4}$
T. 7 S., R. 2 W., Section 17, S$\frac{1}{2}$NW$\frac{1}{4}$, N$\frac{1}{2}$SW$\frac{1}{4}$, SE$\frac{1}{4}$SW$\frac{1}{4}$, SE$\frac{1}{4}$, S$\frac{1}{2}$NE$\frac{1}{4}$
Section 20, All
Section 29, All
Section 32, All

As to the problem of fencing, this has been solved, by the erection of fences on the west and east of the driveway during the past few years. These fences protect the driveway from grazing by trespass livestock and give a boundary to the driveway.

The Rattlesnake Creek Stock Driveway is used by ranchers to move livestock from their ranches around Dillon, Montana, to summer range on the Grasshopper Creek drainage and on the National Forest.

Six livestock operators use this driveway to move stock to and from their summer range and to the fall markets. These operators trail herds of various size with the total number of livestock being approximately 2,300 cattle and 10,000 head of sheep. The time of use is the early part of May and June and the latter part of September. The period of use covers about twelve days at these two periods of the year with the average length of time on the driveway being one day.

According to studies made on this trail the feed is not sufficient to supply the demand so the ranchers haul feed when they trail. At present no water it available on the driveway itself, but livestock can fill up at Taylors Creek on the west end, cross the driveway in one day and be on water at a well on Ten Mile Creek on the east.

Adjustments necessary to provide a usable trail are the withdrawal of approximately 1,760 acres of public domain and the acquisition of about 640 acres of private and State lands through exchange or purchase.

The following is a list of lands now vacant and under Section 15 lease, which should be withdrawn and added to this driveway:

T. 7 S., R. 10 W., Section 10, E$\frac{1}{2}$E$\frac{1}{2}$, E$\frac{1}{2}$W$\frac{1}{2}$, W$\frac{1}{2}$NW$\frac{1}{4}$
Section 7, N$\frac{1}{2}$S$\frac{1}{2}$
Section 15, N$\frac{1}{2}$NE$\frac{1}{4}$, S$\frac{1}{2}$NW$\frac{1}{4}$
Section 17, S$\frac{1}{2}$N$\frac{1}{2}$

T. 7 S., R. 10 W., Section 18, S½N½
T. 7 S., R. 11 W., Section 11, N½SE¼
Section 12, N½SE¼
Section 13, S½N½
Section 14, S½N½
Section 15, N½

Private or State lands needed for trailing purposes, which should be acquired by exchange under Section 8 of the Taylor Grazing Act are as follows:

T. 7 S., R. 10 W., Section 16, W½, SE¼
T. 7 S., R. 11 W., Section 16, N½

That part of the driveway which extends north through T. 6 N., R. 10 W., is not used by any live stock operators for the purpose of moving stock from one area to another. Therefore, this part of the driveway should be revoked and restored to vacant public domain status and leased. The part to be revoked is as follows:

T. 6 S., R. 10 W., Section 22, N½NE¼
Section 23, W½E½, N½NW¼
Section 26, W½E½
Section 35, W½E½, N½SW¼
Section 34, NE¼SE¼, SW¼SE¼
T. 7 S., R. 10 W., Section 3, Lot 2, SW¼NE¼, NW¼SE¼
Section 4, N½SW¼

The range improvements needed on this driveway, to better utilize this withdrawal, are twelve miles of fence to protect the driveway from grazing by trespass livestock and give the driveway a boundary. The development of a well in Section 16, T. 7 S., R. 10 W., would alleviate the water situation.

It has also been suggested that a stipulation be included in the grazing leases on Sections 1, 2, 11 of T. 7 S., R. 10 W., and Sections 28, 30, and 32, T. 6 S., R. 9 W., to permit livestock to be trailed across certain portions of this land which is more or less an established route through Frying Pan Basin. It is used by four or five livestock operators moving livestock from their ranches north of Dillon, to the regular stock trail on Rattlesnake.

The Blacktail and the south part of the Sweetwater Driveway is the longest of all the driveways in the basin and is used more than any other. It is used by livestock operators for moving their livestock from their ranches around Dillon, Montana, and in the Ruby drainage, south of Alder, Montana, to and from summer range located in the Centennial Valley and the National Forest.

Thirteen livestock operators, both sheep and cattle, utilize parts of this driveway. These operators trail herds of various sizes with the total number of livestock being approximately 5,240 cattle and 30,000 sheep. Some operators use just parts of the driveway, while others use it going to the summer range and may use an alternate route on the return trip, depending on weather conditons.

The condition of the vegetation ranges from good to excellent and is able to support the number of livestock now using the trail without deteriorating the range. Stock water is adequate at different points on the trail.

Adjustments necessary to provide a continuous and usuable trail will include the withdrawal of approximately 1,040 acres of public domain and the acquisition of about 2,960 acres of private and State lands through exchanges or purchases.

The following is a list of lands now vacant and under Section 15 lease, which should be withdrawn and added to this driveway:

T. 9 S., R. 6 W., Section 12, NE$\frac{1}{4}$SE$\frac{1}{4}$, SW$\frac{1}{4}$SE$\frac{1}{4}$
T. 11 S., R. 6 W., Section 5, SE$\frac{1}{4}$SE$\frac{1}{4}$
Section 8, E$\frac{1}{2}$
Section 9, SW$\frac{1}{4}$NW$\frac{1}{4}$
Section 17, NW$\frac{1}{4}$NE$\frac{1}{4}$
T. 12 S., R. 6 W., Section 35, NE$\frac{1}{4}$

Private or State lands needed for trail purposes, which should be acquired by exchange under Section 8 of the Taylor Grazing Act are as follows:

T. 10 S., R. 6 W., Sections 16, 21, 28
Section 33, N$\frac{1}{2}$, SE$\frac{1}{4}$, E$\frac{1}{2}$SW$\frac{1}{4}$
T. 11 S., R. 6 W., Section 4, Lots 1, 2, 3, 4, S$\frac{1}{2}$N$\frac{1}{2}$
T. 12 S., R. 6 W., Section 36, SW$\frac{1}{4}$

That part of the driveway which extends into T. 12 S., R. 7 W., is not used by any livestock operators for the purpose of moving livestock to and from summer range. Therefore, this part of the driveway should be revoked and restored to vacant public domain status and leased. The part to be revoked is as follows:

T. 12 S., R. 7 W., Section 12, NW$\frac{1}{4}$
Section 11, E$\frac{1}{2}$
Section 14, E$\frac{1}{2}$
Section 23, E$\frac{1}{2}$
Section 26, N$\frac{1}{2}$
Section 27, N$\frac{1}{2}$
Section 28, N$\frac{1}{2}$, SW$\frac{1}{4}$
Section 32, SW$\frac{1}{4}$
Section 33, W$\frac{1}{2}$
T. 13 S., R. 7 W., Section 5, W$\frac{1}{2}$W$\frac{1}{2}$, E$\frac{1}{2}$SW$\frac{1}{4}$, Lots 1, 2
Section 8, NW$\frac{1}{4}$

The range improvements needed on this driveway, to better utilize this withdrawal will be the fencing of both sides of the driveway to the north, from Blacktail to Sweetwater Creek road. The fences will aid in moving livestock, as well as preventing trespass. The present and proposed improvements will be shown on the land classification map of this report.

As it now stands, there are no operators who actually use the Sage Creek and Basin Creek Stock Driveway withdrawal to move their livestock to and from summer range in the Centennial Valley. Some operators use the lower part of the driveway to move stock to market and to the Lima Reservoir road. When driving livestock, the operators use the main road which follows along the Lima Reservoir; or travel the easiest route across country which is possible now because most of the land is unfenced.

More fences are now being constructed along the roads, as well as on the range, making it nearly impossible to go across country with herds of cattle and bands of sheep. To insure that this driveway be utilized for the purpose which it was withdrawn it will be necessary that several adjustments be made to make it a continuous driveway.

Adjustments necessary to provide a continuous and usable driveway will be the withdrawal of approximately 1,560 acres of public domain and the acquisition of about 1,240 acres of private and State lands through exchanges or purchases.

The following is a list of lands now vacant and under Section 15 lease, which should be withdrawn and added to this driveway:

T. 12 S., R. 8 W., Section 34, SE¼SE¼
Section 35, S½S½
T. 13 S., R. 6 W., Section 2, SW¼NW¼, W½SW¼
T. 13 S., R. 7 W., Section 20, S½
Section 29, SW¼, W½SE¼, NE¼SE¼
T. 13 S., R. 8 W., Section 2, E½W½, E½
Section 19, SE¼

Private or State lands needed for trailing purposes, which should be acquired by exchange under Section 8 of the Taylor Grazing Act are as follows:

T. 12 S., R. 8 W., Section 34, SW¼SE¼, SE¼SW¼
T. 13 S., R. 6 W., Section 15, N½
Section 16, S½
Section 17, SE¼, W½SW¼
Section 19, SE¼
T. 13 S., R. 7 W., Section 29, N½

There is one tract of this driveway fenced off from the main artery and is not used for the purpose of moving livestock. Therefore, this tract should be revoked and restored to vacant public domain status and used for exchange purposes.

The range improvements needed on this driveway, to better utilize this withdrawal are 45 miles of fence to protect the driveway from grazing trespass livestock and give the driveway a boundary. The development of a reservoir or well in Section 10 or 11 would alleviate the water situation on this driveway.

The Sheep Creek Stock Trail is used only by local ranchers in the Sheep Creek basin to go from their spring range to their summer range in the forest and return in the fall. This trail is adequate for the present use.

There are several disconnected lands withdrawn for stock driveway that are not used for the purpose of moving livestock from one area to another. Therefore, these isolated driveways should be revoked and restored to vacant public domain status and leased. These tracts are as follows:

T. 1 S., R. 14 W., Section 4, Lots 1, 2, 3, 4,
T. 7 S., R. 6 W., Section 2, W½

T. 7 S., R. 6 W., Section 3, E½
Section 10, E½
Section 11, NW¼
Section 14, SW¼
Section 15, E½
Section 23, All
Section 26, NW¼, NW¼SW¼
Section 32, S½S½
Section 33, SW¼, NE¼
Section 34, W½NW¼
T. 8 S., R. 6 W., Section 6, Lots 2, 3, 4, 5, SE¼NW¼
T. 8 S., R. 7 W., Section 1, Lot 1, S½NE¼, SE¼
Section 12, NW¼
Section 11, NE¼
Section 23, SE¼
Section 26, E½
Section 35, All
T. 9 S., R. 6 W., Section 4, S½
Section 5, S½, S½NW¼, Lots 3, 4
Section 6, Lots 1, 2, 3, 4, 5, SE¼NW¼, SE¼, S½NE¼
Section 9, E½
Section 10, W½
T. 9 S., R. 7 W., Section 1, All
Section 2, All
T. 10 S., R. 6 W., Section 34, S½
T. 12 S., R. 14 W., Section 1, Lots 1, 2, 3, 4
Section 2, Lots 1, 2, SW¼NE¼, NW¼SE¼, N½SW¼
Section 3, N½SE¼, Lots 2, 3, 4, SW¼NE¼, S½NW¼
Section 4, Lots 1, 2, 3, 4, S½N½
T. 13 S., R. 10 W., Section 15, W½
Section 21, E½
Section 22, W½
Section 28, All
Section 29, SE¼
Section 31, S½
Section 32, All

It is suggested that a map be made showing the driveways to be used, giving name or number of the driveway. The map should show all the existing range improvements and facilities necessary for the proper use of the trails. This map should be furnished to all livestock operators using the trails. Also, a sheet be attached to each copy of the map giving the number of days to be on trail, fall and spring, and any other information found important for ranchers trailing livestock.

Cadastral Surveys

The simple, unpretentious cadastral monuments, coupled with the other provisions of the official cadastral surveying scheme, are basic to the acquisition or use of any part of the public domain. By actually marking the corner on the ground, they create land boundaries, identify lands, determine areas upon which depends clear title to the land, and thereby limit boundary disputes in administering the public domain and its resources.

Legal land boundaries were surveyed in parts of the basin before 1900 and have never been resurveyed. The original monuments were of stone and the marks of identification were chiseled in by hand. Some of these stones are gone, while on others the marks have disappeared and in some places the stones were marked on one side only. The east bench unit of the Jefferson area (Reclamation project) was resurveyed in 1950 and new monuments placed on the ground at that time. Areas near Boulder, Montana, were resurveyed in 1952 and 1953.

In the areas where the monuments are missing it is very difficult to establish definite legal lines, except by some one who is very familiar with local operating units and land boundaries. Therefore, to facilitate the administration of the land in the Upper Missouri Basin it is recommended that parts of the following townships be resurveyed as soon as possible: T. 6 N., R. 1 E., 1 W.; T. 5 N., R. 2 W., 3 W., 4 W.; T. 4 N., R. 1 W., 2 W., 7 W.; T. 3 N., R. 4 W.; T. 2 N., R. 2 W.; T. 2 S., R. 3 W., 7 W., 8 W.; T. 5 S., R. 3 W., 5 W., 7 W., 8 W., 9 W.; T. 6 S., R. 4 W., 5 W., 9 W., 12 W.; T. 7 S., R. 6 W.; T. 8 S., R. 1 E., 5 W., 8 W., 12 W.; T. 9 S., R. 1 E., 1 W., 6 W.; T. 10 S., R. 6 W., 10 W., 11 W., 13 W.; T. 11 S., R. 13 W.

Timber and Woodland Problems

The study area of the basin has 270,027 acres of forest land of which 174,872 acres in on public domain. The largest block of this timber is located in the Upper Centennial Valley, along the Continental Divide. The second largest block is located in the Ruby Mountains, southwest of Sheridan, Montana. In addition to these heavily forested areas, there is a considerable acreage of forest land on public domain scattered throughout the basin, as shown on the land classification map.

Administration of these timbered areas is necessary for the prevention, detection and suppression of fires in order to protect the watershed values, the forage resources, and the existing and potential timber resources. In order to protect the timber stands, several roads been proposed, as shown on the land classification map, to provide quick access to the forested areas for the suppression of fires, as well as for use and management of the timber resources. Also, several fire tool caches should be placed at strategic points along the routes to these spur roads, so that those responsible for the administration of these lands will have the tools necessary for the suppression of fires. Timber and woodland have also been discussed under the Resource section and the Land Ownership section of this report.

Mineral Problems and Management

An increased demand for virtually all metal and mineral products has resulted in a more thorough search for, and exploitation of, minerals for defense purposes. New discoveries and improvements in technology will facilitate recovery of a greater proportion of the useful minerals. These new improvements may create new uses for certain minerals, or may extend the range of commercial operations into lower grade resources, both for defense and non-defense purposes.

The county records show that there are several thousand mining claims on file that are unpatented. These claims constitute a lien against the land. In most instances they conflict with the use of the surface resources. Many claims are located near mineral deposits for speculative or other purposes. It is very important that such invalid or fake claims be investigated as soon as possible so that they can be cancelled out to clear the title to lands for management and development. It is also very important that we do not hinder or discourage the legitimate prospecting and development of our mineral resources which are vital at this time for defense and non-defense purposes.

The presence of minerals in much of the area creates a further problem for the administrator on grazing and timber lands. Mining operations quite often interfere radically with the use of the surface along vital streams and watering places, also along roads and in areas valuable for forage or timber. The surface of the unpatented lode claims is subject to possessory right of the mining claimant who has exclusive use of the timber and other resources when they can be used for mining purposes.

BENEFITS AND COSTS OF THE MANAGEMENT AND DEVELOPMENT PROGRAM

The cost of improvements proposed in the Upper Missouri River Basin and the benefits derived therefrom are summarized in Table 13. This tabulation lists the improvements on lands by two different types of ownership; Federal and other (private and State).

The benefits are calculated on a long term average, and will increase to a maximum until the project becomes established. Stockwater reservoirs will be usable as soon as they are filled after construction, wells and springs are usable as soon as they are constructed and in operation, while vegetation on reseeding, waterspreading and contour furrowing areas may take from one to five years to become established. After these improvements have been completed there should be a gradual increase in vegetation until the maximum productivity is reached.

On-site benefits may be calculated for most of the improvements indicated. On-site benefits are considered to be those benefits which are derived in the immediate vicinity of the improvements. These benefits may take the form of increased carrying capacity, greater livestock gain due to strategically located stock water, better distribution of livestock and other related benefits.

The on-site benefits for waterspreading, reseeding, sagebrush eradication, and other revegetation practices have been calculated on the basis of the increase, in forage production that will be realized from the improvements. Benefits from stock water developments have been calculated on the basis of probable animal gain to be realized from an adequately watered range over those to be realized from an inadequately watered range. The actual cost of the proposed improvements on public domain have been calculated to be $472, 860. Estimated annual maintenance, interest and depreciation costs are $40, 729. The estimated gross annual income from on-site benefits is $87, 524. When considering both on-site and off-site benefits it is estimated that the return on the capital invested in these improvements will be $2. 28 for every dollar spent.

Improvements Proposed for On-site Benefits

1. Stockwater Reservoirs

Stockwater reservoirs are proposed where feasible to cut down on the distance livestock have to go to water and also to get better distribution on the range. When the distance between water holes are too great, stock will trail to water instead of grazing from one watering place to the next. This trailing, instead of grazing, cuts down on the pounds of gain each animal may make per day. Studies of increased gains per animal on the range through the addition of more frequent water supplies, indicate an additional gain from one-fourth pound to as high as three-fourths pound per animal per day. In calculating benefits derived from the stockwater developments proposed in this report, the figure of one-half pound of additional gain per animal per day was used. Estimating that 40 animals would use each reservoir for a period of 90 days, the increased gains would be 1,800 pounds per reservoir. Recent economic studies consider $16.50 per hundred weight as the long term average price of beef. Using this price, each reservoir would return a gross profit of $297 annually. On this basis, the gross on-site benefits on the 35 reservoirs proposed for the basin would be $10,395.

The value of readily available stockwater can best be shown by citing actual experiences of Montana stockmen. One stockman near Three Forks, Montana, improved the water situation on his range by pumping water from the Jefferson River into several strategically located cement tanks. His steers, during the 1951 grazing season, gained around a hundred pounds more per head than steers running on the same range for the same period of time during the 1950 grazing season. The forage production for the two seasons was essentially the same in this vicinity. This stockman feels that his water system paid for itself in the first year of operation. 21/

A report on a reservoir in Valley County shows that the annual benefits from this reservoir exceed $750. This is considerably higher than the benefit calculated for each reservoir in the Upper Missouri Basin. Another such example, reported from Miles City, Montana, of a small reservoir costing only $65, cites an annual return of $256, or nearly four times the cash outlay of the dam. A summary of county agent reports, over a six-year period ending in 1937, shows that the estimated annual income as a result of the construction of several reservoirs is reported to be far in excess of the cost of construction or over 100 percent return on the investment. 22/

21/ Conversation with private rancher, Mr. Pete A. Tocci, during May of 1952.

22/ Small Reservoirs for Stockwater, Mont. State College Agric. Exp. Station, Bozeman, Montana, Circ. 154, September 1939.

Annual costs have been calculated for maintenance, interest, and depreciation. Yearly maintenance is allowed as a percent of the construction costs. This percent, based on the experience of the Resource Development Branch of the Bureau of Land Management, varies from 2½ to 10 percent for various improvements. Interest is figured at 2½ percent, a standard rate for federal projects. Depreciation is based on a life expectancy of 15 years. These charges are listed in Table 13, and when added together are listed under total annual costs ($4, 203).

2. Waterspreaders

Waterspreading has been proposed on 3, 601 acres of Federal range. Waterspreading is simply a method of applying flood irrigation, where topography permits, to areas otherwise fertile but which, due to lack of moisture, are low in forage production. These projects have a high rate of forage production and have an added advantage of also providing green succulent feed over a longer period each season.

"Waterspreading structures have increased forage production in certain locations in the Wind River Basin in Wyoming to more than one animal unit month per acre and on the better sites production increased to over three animal unit months per acre. Records of the Alzada waterspreading project in Montana show an increase in forage production of more than 250 percent while in the Hale project in the same State shows an increase of over 500 percent." 23/

From this data it appears logical to assume that waterspreading on favorable sites in the Upper Missouri Basin would raise the carrying capacity to an average of 1½ to 2 acres per animal unit month. On this basis, the increase in carrying capacity for the 3, 601 acres of proposed waterspreading would be 1, 800 animal unit months. Valuing an animal unit month at $2, the resultant on-site benefits would be $3, 600. The total costs, figured as previously indicated, with the exception of depreciation (since no expected life has been assigned waterspreaders) amount to $2, 971.

3. Contour Furrows

Contour furrows have been proposed on 395 acres of Federal range. This type of treatment has much the same effect as waterspreading, but to a lesser degree. The furrows simply

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23/ Detailed Land Classification Report of Bighorn Basin, Division of Lands, Bureau of Land Management, 1953, p. 148.

hold water in place and allow for greater percolation. They handle a limited amount of water and do very little in the way of spreading water. Contour furrows may be used on slopes up to 15 percent and are not proposed on areas which have a very low carrying capacity. On-site benefits from contour furrows are computed on the basis of increased carrying capacity and off-site benefits are computed on sediment storage basis. Grazing capacity on the total area treated is anticipated to be 119 animal unit months, valued at $2.00 per animal unit month.

4. Diversion and Detention Dams

These dams have primarily off-site benefits in the form of sediment storage and flood control, but also have on-site benefits as well. The on-site benefits are computed in the same manner as the stockwater reservoirs. The off-site benefits are based on sediment stored up-stream.

5. Wells and Springs

Wells and springs have on-site benefits only. These benefits were treated in the same manner as the on-site benefits for stockwater reservoirs.

6. Reseeding, Brush Removal and Rodent Control

On-site benefits based on increased carrying capacity were computed for these forms of range improvements in the manner previously indicated. No off-site benefits were computed.

7. Check Dams

Check dams were handled in much the same manner as the stockwater reservoirs, but were considered to have approximately one-sixth the beneficial effects of a stockwater reservoir for on-site benefits. Off-site benefits were handled on the sediment storage basis at a rate of one-sixth acre foot of sediment stored per check dam.

8. Fences

Sixty-two miles of fence were proposed in the basin which are located exlusively on stock driveways. Due to the intangible nature of the benefits derived from improvements of this type, they were not included in computations of benefit ratio.

9. Camp Sites

Six suitable camp sites were located in the Upper Missouri Basin and it is proposed that they be developed for public camp grounds.

10. Truck Trails

The value of timber, reproduction, range and watershed on 60,234 acres is $1,711,480. These values are estimated on the basis of a one hundred year rotation, therefore, the annual value would be one percent or $171,115. Due to the construction of the truck trail this land is better protected and an annual benefit due to the trail would be placed at 50 percent of the total value of timber annually, making a total gross annual benefit of $85,558 for 45 miles* of truck trail.

Off-site Benefits

In addition to the more tangible on-site benefits, off-site benefits exist for most of the improvements proposed in this watershed. In the case of check dams and detention dams the benefits derived therefrom are almost exclusively of the off-site nature. Off-site benefits take many forms, the most easily recognized are the reduction of flood crests and the reduction of sediment in the fertile downstream areas. Due to these far reaching benefits it is impractical to assign a monetary return on funds invested in each of the proposed structures.

Benefits from improvements proposed on private and State lands, as tabulated in Table 13, were calculated on the same basis as those on the public domain, except that the interest was calculated at four percent annually.

A summary of benefits and costs for the classification area on a per acre and gross basis for the lands in different types of ownership is presented in the tabulation on page 91.

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* 24.5 miles of this truck trail is on Federal land and 20.5 miles is located on private land. Since all of the trail is used to protect the same body of timber and one part of the trail is useless without the other part it is considered together here. In Table 13, for clarity, the benefit has been split.

Summary of Benefits and Costs
(Upper Missouri Basin)

BENEFITS

Type of Land Ownership	Area Acres	Gross Annual Total (Dollars)	Gross Annual Per Acre (Dollars)	Net Annual Total (Dollars)	Net Annual Per Acre (Dollars)
Federal	1,149,031	87,524	.076	55,360	.048
Private and State	1,782,364	72,766	.041	41,666	.023
Total	2,931,395	160,290	.055	97,026	.033

In this tabulation Federal lands are principally public domain with minor amounts of stock-driveway and reclamation withdrawal lands. All under the administration of the Bureau of Land Management. A small area in other types of Federal administration is included. The area of water surface and cities, 31,317 acres, and of cropland , 407,427 acres, is not included, so the total above does not equal the study area total of 3,370,139 acres. The total tabulated is the total area of rangeland.

COSTS

Type of Land Ownership	Area Acres	Construction Total (Dollars)	Construction Per Acre (Dollars)	Annual Total (Dollars)	Annual Per Acre (Dollars)
Federal	1,149,031	472,860	.411	40,729	.035
Private and State	1,782,364	464,768	.260	32,586	.018
Total	2,931,395	937,628	.320	73,315	.025

Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/

Montana Principal Meridian									
Twp. North	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
10	1	5	SW¼	177.00	Rolling	1-2-3	VI	1-2-3-6	Federal
		6	SE¼	162.00	Rolling	1-2-3	VI	1-2-3-6	Federal
		14	N½NE¼, SE¼NE¼	120.00	Rolling to steep	1-2-3	30/VI:90/VIII	1-2-3	Federal
		17	NW¼SW¼	40.00	Rolling	1-2-3	VI	1-2-3-6	Federal
	2	27	E½, E½NW¼						
		26	All except pat. mining claims						
		34	NE¼, NW¼SE¼, Lots 1,2, E½SW¼						
		35	NE¼SE¼, SE¼SW¼, Lots 2, 3,4,6,8,9,10	1560.00	Rolling to steep	1-2-3	VII	1-2-3-5-7	Federal
8	3	4	Lots 5,6,7,10,11						
		5	Lots 8,14,15,16						
9	3	32	S½SW¼, NW¼SE¼	448.18	Rolling to steep	1-2-3-7	VII	1-2-3-6-7	Federal
7	4	29	W½SW¼, SW¼NW¼						
		30	SE¼NE¼, NW¼SE¼	200.00	Rolling to steep	1-2-3	VI	1-2-3-6	Federal
5	5	2	All	612.48	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal
	6	8	W½SW¼, SE¼SW¼	120.00	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal
4	2	12	Lots 2,3,6, SW¼NW¼						
		2	Lot 5	170.68 4/	Rolling to rough	1-2-3	VII	1-2-3-6	Federal
	3	6	Lots 1,2,3,6,7,8,9,11, 12,13	348.16 4/	Rough to steep	1-2-3	VII	1-2-3-6	Federal
	3	4	Lots 1,2,3,4, S½N½, NW¼SE¼, N½SW¼, SW¼SW¼						
		8	N½N½, S½NW¼						
5	3	28	SE¼, W½W½						
		32	All						
		31	Lots 1,2,3,4,5,6,NE¼SW¼, E½NW¼, W½NE¼	2103.36	Rough to steep	1-2-3	VII	1-2-3-5-6	Federal
4	2	24	SE¼SE¼	40.00 4/	Rolling to steep	1-2-3	VII	1-2-3-6	Federal
	3	24	N½NW¼, NW¼NE¼, SW¼, SW¼SE¼	320.00	Rough to steep	1-2-3	VII	1-2-3-6	Federal
		18	Lots 2,4,7,8,9,12	159.34	Rolling to steep rocky cliffs	1-2-3	80/VII:79.34/VIII	1-2-3-6	Federal

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. North	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
4	4	6	NE¼NW¼, NE¼NE¼, NW¼SE¼, S½SE¼	221.82	Steep	1-2-3	VII	1-2-3-6	Federal
		8	E½NE¼, SE¼, SW¼NW¼, SW¼SW¼	320.00	Steep	1-2-3	VII	1-2-3-6	Federal
		10	W½	320.00	Steep to rough	1-2-3	VII	1-2-3-6	Federal
		18	SE¼SE¼, W½E½, W½	599.04	Rough to steep	1-2-3	VII	1-2-3-6	Federal
		20	N½, SW¼	480.00	Rough to steep	1-2-3	VII	1-2-3-6	Federal
		29	N½NE¼, NE¼NW¼						
		30	N½, NW¼SW¼, S½SW¼, NE¼SE¼	605.36	Rough to steep	1-2-3	VII	1-2-3-6	Federal
3	12W	28	N½SE¼	80.00	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
	11W	17	SW¼NE¼	40.00	Rough to steep	1-2-3	VII	1-2-3-5	Federal
	2	22	Lots 1,2,3,7	129.03 4/	Gentle slope	1-2-3-6	VI	1-2-3-6	Federal
		34	Lots 2,5,8	91.74	Steep	1-2-3-6	VII	1-2-3-6	Federal
	4	6	W½, W½E½, E½NE¼, SE¼SE¼						
		8	E½	920.00	Steep, rough, rocky	1-2-3	VII	1-2-3-6	Federal
	5	4	S½						
		9	All						
		15	All	1556.47	Rolling to very steep	1-2-3	VII	1-2-3-6-7	Federal
		26	Lots 1,2,3,4,6,7,8, NE¼SW¼	295.53	Steep to rough	1-2-3	VII	1-2-3-6-7	Federal
North	West								
2	13	12	Lots 1,2, NW¼NE¼	119.83	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
		20	SE¼						
		22	S½	489.87	Rolling to rough	1-2-3-6	VII	1-2-3-6-7	Federal
		24	Lots 1,2, E½NE¼, NW¼SE¼	200.71	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
		28	N½NE¼, SE¼NE¼	120.00	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
		34	S½S½	160.00	Level to rough	1-2-3-4-6	50/V:110/VII	1-2-3-4-6-7	Federal
North	East								
2	1	26	Lot 1	15.57	Level	1-2-6	V	1-2-6	Federal
	5	14	E½NE¼						
		24	NW¼, N½SW¼, W½E½, Lots 1, 2,3,4						
		25	Lots 1,2	735.20	Rough to steep	1-2-3-6	VII	1-2-3-6-7	Federal

-Continued

Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. North	Range East	Sec.							
2	6	29	SW¼SW¼						
		30	S½SE¼, SE¼SW¼						
		31	E½SE¼, SW¼SE¼						
		32	S½S½, NW¼SW¼, W½NW¼						
		33	SW¼SW¼	602.68	Rough to steep	1-2-3-6	VII	1-2-3-6-7	Federal
North 1	West 1	24	SW¼NE¼	40.00	Level	1-2-6	V	1-2-6	Federal
		18	Lots 2,3,4, SE¼, S½NE¼, SE¼NW¼, E½SW¼	473.54	Rough	1-2-3	VII	2-3-6	Federal/ State
	2	12	E½E½, W½SE¼, N½SW¼, SE¼NW¼, SW¼NE¼						
		13	All						
		14	All	1680.00	Rough	1-2-3	VII	2-3-6	Federal/ State
		18	Lot 9						
		19	Lots 3,5						
		20	Lots 1,2,7						
		22	Lot 4	67.45	Rolling	1-2-6	VI	2-3-6	Federal/ State
		30	All	640.00	Steep	1-2-3	VIII	2-3-6	Federal/ State
	3	13	Lots 5,7,8,9						
		24	Lots 1,2,3, W½NE¼, SE¼	402.10 4/	Very steep and rough	1-2-3	VII	2-3-6	Federal/ State
		28	E½SW¼	80.00	Rough to steep	1-2-3	VII	1-2-3-5-6	Federal
		33	NW¼NE¼, Lot 1, NE¼NW¼	115.68	Rough to steep	1-2-3	VII	1-2-3-5-6	Federal
		32	Lot 9	7.35	Steep to rough	1-2-3	VII	1-2-3-5-6	Federal
		34	W½, W½NE¼						~~Federal~~
		33	SE¼,SE¼SW¼						
South 1	West 3	4	NW¼NW¼	651.40	Rolling to steep	1-2-3	VII	1-2-3-5-6	Federal
North 1	West 4	32	Lots 2,3, SW¼SE¼	61.82	Rough to steep with rocks	1-2-3-6	VII	1-2-3-6	Federal
		32	SE¼SW¼	40.00	Level	1-2-6	V	1-2-6	Federal
		34	W½W½	160.00	Rolling to rough	1-2-3	VII	1-2-3-5-6	Federal

-Continued

Table 12.- Description and Classification of Public Domain Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. North	Range West	Sec.							
1	13	4	E½, E½SE¼, SE¼NW¼	441.31	Rolling to rough	1-2-3-6	VII	1-2-3-6-7	Federal
		8	E½SE¼, SW¼SE¼, S½SW¼, SE¼NW¼	240.00	Level to rolling	1-2-3-6	VII	1-2-3-6	Federal
		18	E½NE¼, SE¼, SE¼SW¼	280.00	Level to rolling	1-2-3-6	80/V:200/VII	1-2-3-6	Federal
	14	23	SE¼SE¼	40.00	Level to rolling	1-2-3-6	VI	1-2-3-6-7	Federal
		26	S½, N½NE¼, NE¼NW¼,SE¼NW¼	480.00	Rolling to rough	1-2-3-6	VII	1-2-3-6-7	Federal
	15	28	SW¼NW¼, N½NW¼, NW¼SW¼	160.00	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
North	East								
1	6	5 6	All Lots 1,2,6,7	723.27	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal
		31	SE¼	164.99	Rough	2-3	VIII	2-3-6-7	Federal
	7	20	E½E½	160.00	Rough	1-2-3	VII	1-2-3-6-7	Federal
South	West								
1	1 2	6 7 12	SW¼NE¼, W½SE¼, SW¼, SE¼NW¼ NW¼NE¼, N½NW¼, SW¼NW¼ NE¼, E½SW¼, NW¼SW¼, NW¼	903.36	Steep, rocky ridges	1-2-3-5	VII	1-2-3-5	Federal
	1	26	NE¼, SE¼NW¼, NE¼SW¼	240.00	Level to rolling	1-2-3	VI	1-2-3-6	Federal
		23	SE¼SE¼	40.00	Level to rolling	1-2-3	VI	1-2-3-6	Federal
	3	5	S½	320.00	Steep	1-2-3	VII	1-2-3-6-7	Federal
		28	NE¼SW¼	40.00	Steep and rough	1-2-3-6	VII	1-2-3-6-7	Federal
	14	4	Lots 1,2,3,4,S½, S½N½	640.56	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
		18	SE¼NE¼	40.00	Level	1-2-6	V	1-2-6	Federal
	16	10	NW¼NW¼	40.00	Rolling to rough	1-2-3	VII	2-3-6-7	Federal
		17	NW¼NE¼, NE¼NW¼	80.00	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
		18	NW¼, W½NE¼	240.00	Rolling to rough	1-2-3	VII	1-2-3-6-7	Federal
South	East								
1	1	30	NE¼	160.00	Level to rolling	1-2-3	VI	1-2-3-5	Federal
	6	4 5 9	All Lots 1,2,3,4,5,6 NE¼NW¼, SE¼SW¼, SE¼	1130.20	Rough to steep	2-3	VII	2-3-6	Federal
		21	Lots 1,2,3,4,7,8	268.00	Rough to steep	1-2-3	VII	1-2-3-6	Federal
		34	Lot 3	40.53	Steep	1-2-3	VII	1-2-3-6	Federal

-Continued

Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
2	2	31	S½, S½N½						
		32	SW¼	594.37	Steep hills	1-2-3	VII	1-2-3-6	Federal
	3	3	Lots 3,4, S½N½, N½S½, S½SW¼, SW¼SE¼	512.40	Rough to steep	1-2-3-5-7	VII	1-2-3-5-6-7	Federal
		10	All except pat. mining claims	558.29	Rough to steep	1-2-3-5-7	VII	1-2-3-5-6-7	Federal
		11	N½N½, S½NW¼	240.00	Rough to steep	1-2-3-5-7	VII	1-2-3-5-6-7	Federal
		12	NW¼NW¼	40.00	Rough to steep	1-2-3-5-7	VII	1-2-3-5-6-7	Federal
		13	Lots 2,3, N½SW¼, SW¼NE¼	190.69	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
		14	Lots 2,3,4,5,6,7,8,9,10, 12,13, SE¼SW¼, E½SE¼	437.55	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
		15	All, except pat. mining claims	248.14	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
		22	All, except pat. mining claims	611.30	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
		23	Lots 2,3,4,5,7,10,11,12, SW¼SW¼, SE¼SE¼	261.15	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
		24	Lots 4,5,6,8, SW¼SE¼	187.91	Rough to steep	1-2-3-5	VII	1-2-3-5-6-7	Federal
	16	3	Lot 3	40.16	Level	1-2-6	V	1-2-6	Federal
		7	SE¼NW¼, SW¼SW¼	80.00	Level to rolling	1-2-3-6	VI	1-2-3-6-7	Federal
South	East								
2	1	25	Lots 1,2,3,4,5, N½NE¼, SW¼NE¼, E½SW¼	400.00	Rough	1-2-3-6	VII	1-2-3-6	Federal
		35	Lots 1,2,3, NW¼SE¼	132.62	Creek bottom	1-2-6	V	1-2-6	Federal
		32	SE¼NW¼	40.00	Rough to broken	1-2-3	VII	1-2-3-5	Federal
		31	Lot 2, SE¼NW¼	80.00	Rough to broken	1-2-3	VII	1-2-3-5	Federal
	2	6	Lots 1,2,3,7,8,9,10, 13, 14	262.82	Rocky flat	1-2-6	VI	1-2-6	Federal
		19	Lots 9,10,11						
		30	Lots 1,2,3,4,6,SE¼NW¼	200.00	Rough	1-2-6	VII	1-2-6	Federal
	7	20	NE¼NE¼	40.00	Steep slopes	1-2-3	VII	1-2-3-6-7	Federal
		26	E½SE¼	80.00	Steep slopes	1-2-3	VII	1-2-3-6-7	Federal
	8	6	Lots 1,2,3,4,5,7,10,11	284.58	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
3	1	7	Lots 6,7, SE¼SW¼NW¼, N½SE¼SE¼NW¼, S½NE¼SE¼NW¼, S½SW¼NE¼, S½N½SW¼NE¼	70.78	Rolling to gentle slopes	1-2-3-5	VI	1-2-3-5	Federal
		13	SE¼	160.00	Rolling to rough	1-2-3-5	VII	1-2-3-5	Federal
		24	E½	320.00	Rolling to rough	1-2-3-5	VII	1-2-3-5	Federal
		17	Lots 1,6,E½NE¼, NE¼SE¼	191.72	Rolling to gentle slopes	1-2-3-5	VI	1-2-3-5	Federal
		19	Lots 7,8, E½SE¼	121.24	Rolling to gentle slopes and steep	1-2-3-5	VII	1-2-3-5	Federal
		33	SW¼SW¼						
		35	SW¼SW¼						
4	1	3	NE¼NE¼						
		4	NW¼NW¼, S½SW¼	237.55	Gentle to rolling hills	1-2-3	VII	1-2-3-5	Federal
		4	SW¼SE¼	40.00	Gentle to rolling hills	1-2-3	VII	1-2-3-5	Federal
		9	S½NW¼, NW¼NW¼	120.00	Gentle to rolling hills	1-2-3	VII	1-2-3-5	Federal
3	1	33	NE¼SW¼, NW¼SE¼						
		32	SE¼SE¼						
4	1	5	Lot 1						
		9	S½ less pat. mining claim						
		10	Lots 3,4	517.62	Rolling hills	1-2-3	VII	1-2-3-5	Federal
3	1	29	NE¼NW¼, SW¼NW¼,NW¼SW¼						
		30	S½, S½NW¼, SE¼NE¼						
		31	All, except pat. mining claims						
		32	S½SW¼						
	2	25	E½SE¼, SE¼NE¼						
4	1	5	N½S½						
		6	E½NW¼, E½SW¼	Approx.					
		7	NE¼	2280.00	Rolling to steep	1-2-3	VII	1-2-3-5	Federal
3	2	10	All						
		22	E½						
		23	N½SE¼, SW¼NE¼, NW¼						
		24	SW¼, S½SE¼						

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. South	Range West	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
3	2	27	W½, W½E½, E½NE¼						
		34	N½, N½S½						
		35	Lots 1,2,3,4,NW¼SW¼	4000.84	Mountainous	1-2-3	VII	1-2-3-5-7	Federal
		13	Lot 1	10.39	Rolling	1-2-3	VI	1-2-3-5	Federal
		15	All	640.00	Mountainous	1-2-3	VII	1-2-3-5-7	Federal
South	East								
3	1	10	SE¼NE¼, N½SW¼, N½NE¼, NW¼SE¼, SW¼NE¼, E½NW¼, SW¼NW¼	400.00	Rough to steep	1-2-3	VII	1-2-3	Federal
		11	NW¼NW¼	40.00	Rough to steep	1-2-3	VII	1-2-3	Federal
		7	Lot 7	1.70	Rolling	1-2	VI	1-2-5	Federal
		8	Lot 18	40.68	Level to rolling	1-2-3	VI	1-2-3-5	Federal
		32	SE¼SE¼	40.00	Steep to rough	1-2-3	VII	1-2-3-6	Federal
		10	Lots 3,5,7,9						
		15	Lots 1,2,3,4,5,6,7,8,9, 10, NW¼SE¼, SW¼SW¼, E½NW¼	446.37 4/	Steep to rough	1-2-3	VII	1-2-3-6	Federal
		18	Lots 7,8	71.00	Rough and rolling	1-2-3-5	VII	1-2-3-5	Federal
		19	Lots 3,16,17,18,21,22,23, 24,25	159.30	Rough and rolling	1-2-3-5	VII	1-2-3-5	Federal
		21	SE¼SW¼,	40.00	Rough and rolling	1-2-3	VII	1-2-3-5	Federal
		21	Lots 3,6, E½NE¼	158.23 4/	Steep to rolling	1-2-3	VII	1-2-3-5-6	Federal
		22	Lots 1,2,3,4,5,6,7,8,9	4/					
		22	S½SE¼, NW¼SE¼, E½SW¼						
		22	SW¼NE¼	4/					
		26	NW¼SW¼						
		27	NE¼, E½SE¼						
		27	W½, W½SE¼	1109.24 4/	Steep to rough	1-2-3-6	VII	1-2-3-6	Federal
		28	E½NW¼, Lots 1,2	125.14	Rolling to rough	1-2-3	VII	1-2-3-6	Federal
		30	NW¼NW¼	40.00	Rolling to rough	1-2-3	VII	1-2-3-5-6	Federal
		33	Lots 1,2,3,4,NW¼SE¼, SE¼NE¼	4/					
		33	SW¼SW¼, E½SW¼						
		34	NW¼, NW¼NE¼, N½SW¼,SW¼SW¼	4/					-Continued

Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. South	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
3	1	34	SE¼, SE¼SW¼, S½NE¼, NE¼NE¼						
		35	S½, NW¼, S½NE¼, Lots 1,2,3	1517.51	Steep to rough	1-2-3-6	VII	1-2-3-6	Federal
South	West								
3	17	14	W½SW¼	80.00	Rolling	1-2-3	VI	1-2-3-6-7	Federal
		23	S½, S½N½, N½NW¼	560.00	Rolling	1-2-3	VI	1-2-3-6-7	Federal
		24	SW¼SW¼, N½SW¼	120.00	Rolling	1-2-3	VI	1-2-3-6-7	Federal
		26	N½N½, S½S½	320.00	Rolling	1-2-3	VI	1-2-3-6-7	Federal
South	East								
3	1	2	Lots 2,3,4,5,6,9,10, 11,12	335.81	Along creek bottom	1-2-6	VI	2-6	Federal
	2	22	S½S½, N½SW¼, SW¼NW¼	280.00	Steep hills	1-2-3	VII	1-2-3-6-7	Federal
		26	W½W½	160.00	Steep hills	1-2-3	VII	1-2-3-6-7	Federal
South	West								
4	1	2	SE¼NE¼, NW¼SE¼	80.00	Rolling to steep	1-2-3-5	VII	1-2-3-5	Federal
	2	34	E½SW¼, W½SE¼, SE¼SE¼						
5	2	2	All						
		3	S½, NW¼, SW¼NE¼						
		10	W½	1702.00	Rolling to steep	1-2-3	VII	1-2-3-5	Federal
4	15	25	E½E½	160.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
	16	17	S½SW¼, NW¼SW¼						
		18	NE¼SE¼, S½S½						
		19	All						
		20	W½E½, W½						
		28	W½SW¼						
		29	S½, NE¼NW¼, W½NW¼						
		33	W½SE¼, W½						
5	16	4	NW¼NE¼, NW¼	2547.31	Level to rolling	1-2-3-7	VI	1-2-3-6-7	Federal
South	East								
4	1	4	Lots 3,4,5,6						
		5	Lots 5,6,SE¼NE¼, SW¼SE¼						
		8	Lots 1,2,3,4,5,6,7,8, SE¼NE¼, SW¼SE¼,SE¼NW¼						

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. South	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
4	1	17	Lots 1,2,3,4,5,6,7,8, NW¼NW¼, NW¼SW¼,NW¼SE¼						
		20	Lots 1,2,3,4,5,6,7,NW¼NW¼, SE¼SW¼						
		19	Lot 5, SW¼SE¼, NE¼SE¼, SE¼NE¼						
		30	Lots 1,2,4,5,6,7,8,9,10, SW¼SE¼, NE¼SE¼	1656.13 4/	Rough to steep	1-2-3-6	VII	1-2-3-6	Federal
		5	Lots 1,2, SW¼NE¼,NW¼SE¼, Lot 7						
		8	NE¼NW¼, W½SW¼, E½SE¼						
		18	E½NE¼, SW¼NE¼, E½SE¼, NW¼SE¼						
		17	NE¼, E½SE¼, SW¼SW¼						
		20	E½						
		30	SE¼SE¼						
		19	NW¼NW¼, Lot 6	1298.78	Rough to steep	1-2-3-6	VII	1-2-3-6	Federal
	2	22	Lots 1,2,3,4,5,6,7,8, 9,10,11,NE¼SW¼	476.90	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal
		26	W½, S½SE¼	400.00	Level to rough	1-2-3	180/VI:220/VII	1-2-3-6-7	Federal
		20	SW¼NE¼, SE¼NW¼	80.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		24	E½SE¼, SW¼SE¼, SE¼SW¼	160.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		28	NW¼NE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
	4	2	S½NE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		6	E½SE¼	80.00	Steep hills	1-2-3	VII	1-2-3-6-7	Federal
		8	SE¼, E½SW¼, SW¼NE¼	360.00	Rough to steep	1-2-3	VII	1-2-3-6-7	Federal
South	West								
5	1	10	NE¼NW¼	40.00 4/	Level	1-2-6	V	1-6	Federal
		12	SE¼SW¼	40.00 4/	Level	1-2-6	V	1-2-6	Federal
	2	17	N½, SE¼	480.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		18	S½SE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		20	NE¼	160.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal
		21	NW¼	160.00	Rolling to steep	1-2-3	VII	1-2-3-6-7	Federal

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. South	Range West	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
5	2	28	S½, less mining claims						
		32	SE¼						
		33	All, less mining claims						
6	2	5	Lots 1,2,3,7,12						
		4	S½S½, SW¼NW¼, Lots 3,4	1410.60	Rolling to steep	1-2-3-5	VII	1-2-3-5	Federal
5	14	21	E½NE¼, NW¼NE¼, SE¼	280.00	Steep	1-2-3	VII	1-2-3-6-7	Federal
	16	11	NE¼SE¼, W½SE¼, SE¼SW¼	160.00	Level	1-2	V	1-2-6	Federal
		12	NW¼SW¼	40.00	Level	1-2	V	1-2-6	Federal
		14	N½NW¼	80.00	Level	1-2	V	1-2-6	Federal
		15	NE¼NE¼, S½NW¼, W½NE¼, NW¼SW¼	360.00	Level	1-2	V	1-2-6	Federal
South	East								
5	1	34	NE¼NW¼	40.00	Steep hill	3-8	VIII	3-8	Federal
South	West								
6	15	29	S½SW¼	80.00	Rolling	1-2-3	VI	1-2-3-6-7	Federal
	16	1	W½SW¼, Lot 4	127.25	Rolling	1-2-3	VI	1-2-3-6	Federal
7	1	28	S½	320.00	Level to gently rolling	1-2-3-6	V	1-2-3-6	Federal
8	1	4	N½NE¼	88.50	Level and stoney	1-2-3-6	V	1-2-3-6	Federal
		10	W½, N½NE¼, W½SE¼	480.00	Level to gently rolling	1-2-3-6	400/V:80/VI	1-2-3-6	Federal
		14	NE¼	160.00	Level to gently rolling	1-2-3-6	80/V:80/VI	1-2-3-6	Federal
		14	SW¼NW¼, SE¼, W½SW¼	280.00 4/	Level to gently rolling	1-2-3-6	160/V:120/VI	1-2-3-6	Federal
		24	E½, E½SW¼, NW¼, NW¼SW¼	560.00	Level to gently rolling	1-2-3-6	360/V:200/VI	1-2-3-6	Federal
		31	Lots 6,7,8						
		33	NE¼, less mining claims						
9	1	4	Lot 1	242.24	Rocky, steep hills	1-2-3-5	VII	1-2-3-5-6	Federal
South	East								
9	1	6	Lots 3.4.5.6						
		14	S½E½NE¼	397.70	Rocky, steep hills	1-2-3	VII	1-2-3-5-6	Federal
South	West								
9	1	1	Lots 1,2,3,8,9	4/					
		12	Lots 1,2,3,4,5,7,8	4/					
		13	Lots 1,2,3,4,5,6,7,8,10,11,2						
		13	E½SW¼						
		14	Lot 1, NE¼SE¼						

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
9	1	23	Lots 1,2, SE¼NE¼	4/					
		24	W½NE¼, E½NW¼						
		24	Lots 2,3,4,7,8,9,10,SW¼SE¼	4/					
		25	Lots 1,2,4,5,6,9	4/					
		25	SE¼NW¼	1682.23	Benchland	1-2-3-6	VI	1-2-3-6	Federal
10	1	1	E½E½	165.28 4/	Mostly flat with drop off	1-2-3-6	VI	1-2-3-6	Federal
		25	S½NE¼	80.00	Steep canyon	1-2-3-6	VII	1-2-3-6-7	Federal
South	East								
10	1	6	Lots 3,4,5,6,7,E½SW¼, SE¼NW¼	321.82 4/	Benchland	1-2-3-6	VI	1-2-3-6	Federal
		12	All	644.32	Mountainous	1-2-3-6	VII	1-2-3-6	Federal
		18	N½NE¼, SE¼NE¼	120.00 4/	Benchland with drop off	1-2-3-6	VII	1-2-3-6	Federal
		28	NW¼NW¼	40.00 4/	Benchland to rolling to steep	1-2-3-6	VII	1-2-3-6	Federal
		20	NE¼NE¼	40.00 4/	Level	1-2-3-4-6	10/V:30/VI	1-2-3-4-6	Federal
		31	S½NE¼, NE¼NE¼, SW¼NW¼, NW¼SW¼, S½SW¼	282.18	Rolling to mountainous	1-2-3-7	VII	1-2-3-6-7	Federal
		32	W½	320.00	Rolling to mountainous	1-2-3-7	VII	1-2-3-6-7	Federal
		33	S½SW¼	80.00	Mountainous	1-2-3-7	VII	1-2-3-6-7	Federal
11	2	20	SE¼NW¼, E½SW¼, S½SE¼	200.00	Rolling to steep	1-2-3	VII	1-2-3-6	Federal
	1	24	Lots 3,4,7,8	142.59 4/	Steep	1-2-3-6	VII	1-2-3-6	Federal
North	East								
10	2	29	NW¼	160.00	Rough and mountainous	1-2-3	VII	1-2-3	Private
		33	S½SW¼						
9	2	3	Lots 2,3,5,8,10						
		4	SE¼SE¼, S½SW¼, NW¼SW¼, Lots 3,4						
		5	E½SE¼						
		9	Lots 1,2,3,N½NW¼	609.00	Rolling to steep	1-2-3	VII	1-2-3	Private
9	2	5	Lots 2,3,4, SE¼NW¼, SW¼NE¼	206.90	Rolling to steep	1-2-3	VII	1-2-3	Private
	3	34	NE¼SW¼	40.00	Rolling	1-2-3	VI	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. North	Range East	Sec.							
9	2	35	NW¼NW¼						
8	3	1	NE¼SW¼						
		2	E½NE¼, SW¼NE¼, NE¼SE¼, SE¼NW¼	291.44	Rolling to rough	1-2-3	VII	1-2-3	Private
		8	W½NW¼, N½SW¼	160.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		6	Lots 11,12,13,14,15,16	158.91	Rough to steep	1-2-3	23/V:125.91/VII	1-2-3	Private
7	3	6	S½SW¼	80.00	Rolling to rough	1-2-3	VI	1-2-3	Private
	5	2	S½NW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
		13	N½NW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
	6	18	NE¼NE¼	40.00	Rolling foothills	1-2-3	VI	1-2-3	Private
		17	SE¼SE¼	40.00	Rolling foothills	1-2-3	VI	1-2-3	Private
		21	W½NW¼, NW¼SW¼, E½NE¼, SW¼NE¼	240.00	Rolling foothills	1-2-3	VI	1-2-3	Private
		22	N½NW¼	80.00	Rolling foothills	1-2-3	VI	1-2-3	Private
		15	SW¼	160.00	Rolling foothills	1-2-3	VI	1-2-3	Private
6	3	20	W½SW¼						
		30	S½N½, S½	573.42	Rolling to rough	1-2-3	VI	1-2-3	Private
		11	NE¼, E½NW¼, NE¼SE¼, Lots 1,2,5,6						
		14	E½NE¼						
		22	NW¼NE¼, NE¼NW¼	560.00	Rolling to rough	1-2-3	VI	1-2-3	Private
	5	34	E½	320.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	6	28	N½N½, S½NE¼, SE¼NW¼, SE¼SE¼	320.00	Rolling to rough	1-2-3	VI	1-2-3	Private
		6	Lot 4	40.00	Gently to steeply rolling	1-2-3	VII	1-2-3	Private
		2	Lots 3,4, SW¼NW¼, NW¼SW¼, SE¼NE¼	200.00	Gently to steeply rolling	1-2-3	VII	1-2-3	Private
		10	N½NW¼	80.00	Gently to steeply rolling	1-2-3	VII	1-2-3	Private
	7	10	E½, E½W½	480.00	Steep and rocky	1-2-3	VII	1-2-3	Private
5	2	35	S½SE¼, NE¼SE¼	120.00	Rolling	1-2-3	VI	1-2-3	State
		13	NE¼, S½SE¼						
		24	E½						
		25	SE¼, N½SW¼, SE¼SW¼						

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian Twp. North	 Range East	 Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
5	3	18	W½SW¼, SW¼NW¼						
		30	N½	1278.79	Rolling to steep	1-2-3	VII	1-2-3	Private
		6	Lots 1,2, SW¼, W½SE¼						
		8	NW¼, N½NE¼, S½SE¼	643.38	Rolling to rough	1-2-3	VII	1-2-3	Private
		34	S½	320.00	Rough to steep	1-2-3	VII	1-2-3	Private
	5	26	NW¼SW¼	40.00	Rough to steep	1-2-3	VII	1-2-3	Private
		34	NE¼SE¼NE¼NW¼, N½S½N½NE¼, N½N½NE¼, E½NE¼NE¼NW¼, N½NW¼NW¼, N½S½NW¼NW¼, NW¼NE¼NW¼, N½SW¼NE¼NW¼, S½NW¼SW¼,SW¼SW¼	172.50	Rough to steep	1-2-3	VII	1-2-3	Private
	7	32	E½E½	160.00	Rolling to steep	1-2-3	VII	1-2-3	Private
4	1	6	E½SE¼, NW¼SE¼, S½NE¼						
		5	W½, W½SE¼						
		7	E½NE¼, NE¼SE¼						
		8	N½NW¼, SW¼NW¼, NW¼SW¼	882.00	Rolling to steep	1-2-3	VII	1-2-3	State
	2	24	NE¼, W½SE¼, Lot 1,NE¼SE¼	314.46	Rolling to steep	1-2-3	VII	1-2-3	Private
		26	W½	320.00	Rough to steep	1-2-3	VII	1-2-3	State
		34	All	640.00	Rough to steep	1-2-3	VII	1-2-3	State
	3	18	Lots 10,11, E½SW¼,SW¼SE¼	188.80	Rolling to rough and rocky	1-2-3	VII	1-2-3	Private
		26	SW¼SE¼	40.00	Rough to steep	1-2-3	VII	1-2-3	Private
	4	14	SE¼NE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		22	W½NE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	5	2	Lots 1,8	58.79	Rolling to steep	1-2-3	VII	1-2-3	Private
		8	NW¼NW¼	40.00	Rough to steep	1-2-3	VII	1-2-3	Private
		26	E½E½	160.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		34	E½SW¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	6	30	NE¼NE¼	40.00	Steep	1-2-3	VII	1-2-3-7	Private
	7	4	Lots 1,2,3,4,5,6,7,8,9, 10,11,15,16,NW¼SW¼,S½SE¼	705.96	Rolling to steep	1-2-3	VII	1-2-3	Private
		6	Lots 1,2,3,4,5,6,7,10,11 12,13,14,15,17,NE¼SW¼, NW¼SE¼	623.92	Rolling to steep	1-2-3	VII	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. North	Range East	Sec.							
4	7	10	W½	320.00	Rolling to steep	1-2-3	VII	1-2-3	Private
North 3	West 1	8	S½NW¼, N½SW¼	160.00	Rolling	1-2-3	VI	1-2-3	State
		32	S½	320.00	Rolling to rough	1-2-3	VI	1-2-3	State
	12	26	NE¼NW¼, SE¼NE¼, NW¼SE¼, SE¼SE¼, SE¼SW¼	201.16	Rolling to rough	1-2-3	VII	1-2-3	Private
North 3	East 1	12	NW¼	160.00	Rolling	1-2-3	VI	1-2-3	State
		27	SW¼NW¼	40.00	Level to rolling	1-2-3-4	20/V:20/VI	1-2-3	Private
		25	All, less pat. mining claims						
		26	N½, less pat. mining claims	797.34	Rolling to rough	1-2-3	VI	1-2-3	State
	2	19	All						
		30	All	1248.00	Rough to steep	1-2-3	VII	1-2-3	State
		20	All	640.00	Rough to steep	1-2-3	VII	1-2-3	State
		10	W½	325.00	Rough to steep	1-2-3	VII	1-2-3	State
		12	Lots 6,7, SW¼NW¼	97.27	Rolling hills	1-2-3-4	77.27/V:20/VI	1-2-3-4	Private
		4	Lots 1,2,3,4,S½N½, S½	648.00	Rough to steep	1-2-3	VII	1-2-3	State
		6	SE¼SE¼	40.00	Rolling	1-2-3	VI	1-2-3	State
		26	SW¼SW¼	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		34	E½SE¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
		34	W½NW¼, NW¼SW¼	120.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	3	6	NE¼NE¼	39.65	Rolling to steep	1-2-3	VII	1-2-3	Private
		11	SE¼SE¼	40.00	Very steep	1-2-3	VII	1-2-3	Private
		15	SE¼SE¼	40.00	Very steep	1-2-3	VII	1-2-3	Private
		26	N½NE¼, NE¼SE¼, S½SE¼	200.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		26	N½NW¼, SW¼NW¼	120.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		22	NE¼NE¼	40.00	Very steep	1-2-3	VII	1-2-3	Private
		34	SE¼SW¼	40.00	Very steep	1-2-3	VII	1-2-3	Private
North 2	West 1	6	Lots 1,2,3,4,5,6,7,SE¼NE¼	292.13	Rolling to rough	1-2-3	VII	1-2-3	State
		2	Lots 3,4, S½NW¼	155.72	Rolling to rough	1-2-3	VI	1-2-3	State

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. North	Range West	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
2	1	34	S½SE¼, SE¼SW¼	120.00	Rough	1-2-3	VII	1-2-3	State
	13	28	NE¼SE¼, W½NW¼	120.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		32	N½NE¼	80.00	Rolling to rough	1-2-3	VII	1-2-3	Private
North	East								
2	1	2	Lots 1,2,3,S½NE¼,SE¼NW¼, E½SW¼, SE¼	499.05	Rough to steep	1-2-3	VII	1-2-3	State
		30	Lots 1,2,3,4, NE¼NW¼, NW¼NE¼, SE¼SW¼, SW¼SE¼	338.00	Rough to steep	1-2-3	VII	1-2-3	State
		32	W½W½	160.00	Rough to steep	1-2-3	VII	1-2-3	State
	2	12	N½	320.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	3	8	SE¼NE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		12	S½SE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		14	SE¼NE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		20	E½SE¼, NW¼	240.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		20	W½SW¼	80.00	Rough to gently sloping	1-2-3	15/VI:65/VII	1-2-3	Private
		22	N½N½	160.00	Rough to gently sloping	1-2-3	VII	1-2-3	Private
		24	N½N½	160.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	4	8	NW¼, NW¼NE¼	200.00	Rolling to steep	1-2-3	VII	1-2-3	Private
North	West								
1	2	26	SW¼, W½SE¼, Lots 10,11	286.20	Steep and rough	1-2-3	VII	1-2-3	State
		32	E½, E½SW¼	400.00	Steep and rough	1-2-3	VII	1-2-3	State
	3	1	N½NE¼, SW¼NE¼, E½NW¼, NE¼SW¼	240.00	Steep and rough	1-2-3	VII	1-2-3	State
	4	32	Lot 1, SE¼SE¼	77.52	Steep and rough	1-2-3	VII	1-2-3	State
	14	10	NW¼NW¼	40.00	Rolling	1-2-3	VII	1-2-3	Private
		20	W½W½, SE¼NW¼	200.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		20	NE¼SW¼	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		26	NW¼NW¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
		28	NW¼NE¼	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		30	NE¼NE¼, W½NE¼, NE¼SE¼, NE¼SW¼, E½NW¼	280.00	Rolling to rough	1-2-3	VII	1-2-3	Private
	15	28	NW¼NE¼, SW¼SW¼	80.00	Rolling to level	1-2-3-4	40/V:40/VI	1-2-3-4	Private
		32	NE¼, E½SE¼	240.00	Rolling to level	1-2-3	VI	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. North	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
1	1	6	Lots 1,2,3,4, S½NE¼, SE¼NW¼, N½SE¼	412.00	Rough to steep	1-2-3	VI	1-2-3	Private
	2	10	N½NW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
		14	W½W½	160.00	Rough	1-2-3	VII	1-2-3	Private
South	West								
1	1	2	NE¼	162.34	Rough to steep	1-2-3	VII	1-2-3	Private
		4	W½SE¼	80.00	Rough to steep	1-2-3	VII	1-2-3	Private
		9	NW¼NE¼	40.00	Rough to steep	1-2-3	VII	1-2-3	Private
		4	NE¼NE¼	39.03	Rough to steep	1-2-3	VII	1-2-3	Private
		18	Lot 23	4.09	Rough to steep	1-2-3	VII	1-2-3	Private
	2	18	SW¼SW¼	34.00	Rough to steep	1-2-3	VII	1-2-3	Private
		22	S½SW¼	80.00	Steep, rocky outcrops	1-2-3	VII	1-2-3	Private
	3	14	NW¼	160.00	Steep, rough rock outcrops	1-2-3	VII	1-2-3-7	State
	14	29	SE¼SW¼	40.00	Steep to rough	1-2-3	VII	1-2-3	State
	15	10	SW¼SW¼	40.00	Level to rolling	1-2-3	VI	1-2-3	State
		15	W½NW¼, NW¼SW¼	120.00	Level to rolling	1-2-3	VI	1-2-3	State
		31	Lot 2	35.00	Level	1-2-3	V	1-2-3	State
		18	Lot 1	34.59	Level to rolling	1-2-3	VI	1-2-3	State
	16	1	Lot 1, SW¼NW¼	81.25	Rolling to rough	1-2-3	VI	1-2-3	State
		1	SW¼SE¼	40.00	Rolling to rough	1-2-3	VI	1-2-3	State
		11	S½NE¼	80.00	Rolling to rough	1-2-3	VI	1-2-3	State
		12	S½NW¼, NW¼NE¼, Lots 1,2	188.46	Rolling to rough	1-2-3	VI	1-2-3	State
		13	S½NW¼	80.00	Rolling to rough	1-2-3	VI	1-2-3	State
		24	NW¼NE¼	40.00	Rolling to level	1-2-3-4	VI	1-2-3-4	Private
		34	SW¼NW¼	40.00	Level	4	V	4	Private
South	East								
1	1	22	SW¼SW¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	2	2	W½SW¼, SW¼NW¼	120.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		14	W½W½	160.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		22	S½NE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
2	1W	26	SW¼SE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		35	N½SW¼, SW¼SW¼	120.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	2W	19	NE¼NE¼	40.00	Steep to rolling	1-2-3	VI	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
2	2	22	SW¼NE¼, NE¼SE¼	80.00	Steep to rolling	1-2-3	VI	1-2-3	Private
		27	S½NW¼, SW¼NE¼	120.00	Steep to rolling	1-2-3	VI	1-2-3	Private
		28	N½SW¼	80.00	Steep tc rolling	1-2-3	VI	1-2-3	Private
		29	Lot 5	20.00	Steep to rolling	1-2-3	VI	1-2-3	Private
		36	SW¼SE¼, less pat. mining claims	25.00	Rolling	1-2-3	VI	1-2-3	Private
	3	12	SW¼SE¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
	14	31	N½N½, S½NE¼, E½SE¼	313.73	Rolling to rough	1-2-3	VII	1-2-3	State
	15	10	E½, E½NW¼	400.00	Level to rolling	1-2-3	VI	1-2-3	State
		15	E½, NE¼NW¼, SW¼SE¼NW¼, N½SE¼NW¼	390.00	Level to rolling	1-2-3	VI	1-2-3	State
		22	NE¼, N½SE¼, SE¼SE¼	280.00	Level to rolling	1-2-3	VI	1-2-3	State
		27	E½E½	160.00	Level to rolling	1-2-3	VI	1-2-3	State
	16	24	Lot 1	21.67	Level to rolling	1-2-3	VI	1-2-3	Private
		15	NW¼NW¼	40.00	Level to rolling	1-2-3	VI	1-2-3	Private
		21	SE¼SW¼	40.00	Level to rolling	1-2-3	VI	1-2-3	Private
		22	SW¼SW¼	40.00	Level to rolling	1-2-3	VI	1-2-3	Private
		28	NW¼NE¼	40.00	Level to rolling	1-2-3	VI	1-2-3	Private
		26	E½NW¼, SW¼NW¼	120.00	Rolling	1-2-3	VI	1-2-3	Private
		27	W½SW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
		28	SE¼, E½SW¼	240.00	Rolling	1-2-3	VI	1-2-3	Private
		33	NE¼, E½NW¼	240.00	Rolling	1-2-3	VI	1-2-3	Private
		34	W½NW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
		35	W½SW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
South	East								
2	1	26	N½SW¼, NW¼NE¼	120.00	Rough	1-2-3	VII	1-2-3	Private
		34	NE¼	160.00	Rough	1-2-3	VII	1-2-3	Private
		32	NE¼SW¼, N½SE¼	120.00	Rough	1-2-3	VII	1-2-3	Private
		31	Lots 1,3,4, NE¼NW¼, E½SW¼ W½SE¼						
South	West								
3	1	1	Lot 1	375.53	Rough to broken	1-2-3	VII	1-2-3	Private
South	East								
2	2	18	NE¼SE¼	40.00	Rolling hills	1-2-3	VII	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range East	Sec.							
2	2	22	NE¼SE¼	40.00	Steep	1-2-3	VII	1-2-3	Private
South	West								
3	1	3	Lots 1,2	86.00	Rough to rolling	1-2-3	VII	1-2-3	Private
		11	Lots 1,2,3,4,5,6	75.32	Steep	1-2-3	VII	1-2-3	Private
		19	NW¼NE¼SW¼, SE¼SW¼, NE¼NW¼SE¼, S½NW¼SE¼, SW¼SE¼	120.00	Steep and rocky	1-2-3	VII	1-2-3	Private
		25	NE¼SE¼	40.00	Rough to rolling	1-2-3	VII	1-2-3	Private
		26	Lots 1,2, SE¼SE¼	103.00	Rough to rolling	1-2-3	VII	1-2-3	Private
		35	N½NE¼	80.00	Rough to rolling	1-2-3	VII	1-2-3	Private
	15	9	SE¼SW¼	40.00	Level	1-2-3	V	1-2-3	State
		7	SE¼SE¼	40.00	Level	1-2-3	V	1-2-3	State
		25	SE¼SE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	State
	16	3	NW¼SW¼	40.00	Level	1-2-3	V	1-2-3-4	Private
		3	NE¼NE¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
		10	NE¼NE¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
		22	SW¼	160.00	Rolling	1-2-3	VI	1-2-3	State
		23	W½, W½E½	480.00	Rolling	1-2-3	VI	1-2-3	State
		26	W½NE¼, NW¼	240.00	Rolling	1-2-3	VI	1-2-3	State
		27	NW¼	160.00	Rolling	1-2-3	VI	1-2-3	State
		34	NW¼NE¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
South	East								
3	1	32	SE¼NW¼, SW¼NE¼	80.00	Rough to steep	1-2-3	VII	1-2-3	Private
		31	Lots 3,4						
4	1	6	Lot 2	118.00	Rolling	1-2-3	VII	1-2-3	Private
3	1	6	Lot 4	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		14	W½NW¼	80.00	Rolling to rough	1-2-3	VII	1-2-3	Private
	2	3	Lots 1,2,3,4,5,6, S½SW¼	225.03	Rolling to rough	1-2-3	VII	1-2-3	Private
		4	Lot 3	41.85	Rolling to rough	1-2-3	VII	1-2-3	Private
		5	Lot 2	31.14	Rolling to rough	1-2-3	VII	1-2-3	Private
		10	SE¼	160.00	Rolling to rough	1-2-3	VII	1-2-3	Private
	3	14	N½NW¼	80.00	Rolling to rough	1-2-3	VII	1-2-3	Private
South	West								
4	1	10	Lot 8	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
4	1	11	SW¼SW¼	40.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		12	W½	320.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		14	N½, NE¼SE¼, N½SW¼	440.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		15	Lots 5,15, 16, 17	65.35	Rolling to rough	1-2-3	VII	1-2-3	Private
		26	SE¼NW¼, SW¼NE¼, NW¼SE¼, NE¼SW¼	160.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		20	N½NE¼, NE¼NW¼	120.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		15	Lots 8,9,10,11,12,13, 18,19,20,21						
		10	Lots 2,5	275.29	Rolling to rough	1-2-3	VII	1-2-3	Private
	2	10	Lots 1,2,3,4,13,14,16, 15,17,18,19	95.28	Rolling hills	1-2-3	VII	1-2-3	Private
		35	SE¼NW¼	40.00	Rocky rolling hills	1-2-3	VII	1-2-3	Private
		24	S½	320.00	Mountinaous, steep slopes	1-2-3	VII	1-2-3	Private
	15	12	N½SE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	16	21	NW¼NE¼, NE¼SW¼, E½NW¼, NW¼NW¼	200.00	Level to rolling	1-2-3	V	1-2-3	State
South 4	East 3	6	Lots 3,4,5, S½SE¼	201.56	Rolling to steep	1-2-3	VII	1-2-3	Private
South 5	West 1	18	Lots 1,2	92.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		18	E½SE¼	80.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		20	N½NW¼	80.00	Steep rock outcrops	1-2-3	VII	1-2-3	Private
		30	Lots 1,2,3,4, E½W½						
	2	23	E½SE¼, S½NE¼						
		25	All						
		26	NE¼, N½SE¼	1387.04	Rolling to steep hills	1-2-3	VII	1-2-3	Private
		13	NW¼NW¼	40.00	Rolling hills	1-2-3	VII	1-2-3	Private
		14	N½NE¼, NW¼	240.00	Rolling hills	1-2-3	VII	1-2-3	Private
		31	NW¼SW¼	36.76	Rolling hills	1-2-3	VII	1-2-3	Private
		29	NE¼NW¼	40.00	Rolling hills	1-2-3	VII	1-2-3	Private
		34	SE¼SE¼, SE¼NE¼	80.00	Rolling hills	1-2-3	VII	1-2-3-	Private

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Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian			Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
Twp. South	Range West	Sec.							
5	14	20	SE¼NE¼	40.00	Steep to level	1-2-3	VII	1-2-3	Private
		30	Lot 1	43.06	Rolling	1-2-3	VI	1-2-3	Private
		32	NE¼NE¼, SE¼SW¼	80.00	Rolling	1-2-3	VII	1-2-3	Private
	16	3	SW¼SW¼	40.00	Level	1-2-3-4	V	1-2-3-4	Private
6	1	12	NE¼SW¼	40.00	Level to rolling	1-2-3	V	1-2-3	Private
		20	N½NW¼	80.00	Rolling	1-2-3	VI	1-2-3	Private
	2	2	SW¼NE¼	40.00	Rolling	1-2-3	VI	1-2-3	Private
		7	N½SE¼, S½NE¼, NE¼NE¼	200.00	Benchland, steep hills	1-2-3	VII	1-2-3	Private
		8	N½, SE¼, S½SW¼	560.00	Benchland, steep hills	1-2-3	VII	1-2-3	Private
		10	S½SW¼, E½NE¼	160.00	Benchland, steep hills	1-2-3	VII	1-2-3	Private
		20	E½	320.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		28	W½NW¼, NW¼SW¼	120.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		32	All	640.00	Rolling to steep	1-2-3	VII	1-2-3	Private
	3	18	All	590.80	Rolling to steep	1-2-3	VII	1-2-3	Private
		12	SW¼, SW¼NW¼	200.00	Rolling to steep	1-2-3	VII	1-2-3	Private
7	1	18	Lots 3,4	73.14	Rolling	1-2-3	VII	1-2-3	Private
		30	SW¼	152.82	Rolling to steep	1-2-3	VII	1-2-3	Private
		31	SW¼	154.72	Steep	1-2-3	VII	1-2-3	Private
	2	5	N½NE¼, NE¼NW¼	120.00	Rolling to steep	1-2-3	VII	1-2-3	Private
South	East								
7	1	8	NW¼	160.00	Rocky and flat	1-2-3	VII	1-2-3	Private
		22	Lot 1, NE¼SW¼, NW¼SE¼	115.45	Steep to gently rolling slopes	1-2-3	VII	1-2-3	Private
South	West								
8	1	4	SW¼NW¼, W½SW¼, SE¼SW¼, SW¼SE¼	200.00	Level to rolling	1-2-3	70/V:130/VII	1-2-3	Private
		5	N½SW¼, NW¼SE¼	120.00	Rolling hills	1-2-3	VII	1-2-3	Private
		6	Lot 3	42.85	Steep	1-2-3	VII	1-2-3	Private
		20	S½NE¼, SE¼SE¼	120.00	Rolling, rocky	1-2-3	VII	1-2-3	Private
		22	W½E½	160.00	Level slope	1-2-3	V	1-2-3	Private
		26	SE¼NE¼	40.00	Level slope	1-2-3	V	1-2-3-4	Private
	2	12	W½SW¼, SW¼NW¼	120.00	Moderate slope	1-2-3	VII	1-2-3	Private

-Continued

Table 12.- Description and Classification of Public Domain Lands Within the Isolated Tract Area of the Upper Missouri River Basin, Montana, 1953 1/ -Continued

Montana Principal Meridian									
Twp. South	Range East	Sec.	Subdivision	Acres	General Land Character	Present Land Use 2/	Land Capability Classification 3/	Principal Suitability 2/	Proposed Management
8	1	8	SW¼SE¼	40.00	Rocky flat	1-2-3	VI	1-2-3	Private
		22	SW¼NE¼						
		28	S½, N½N½						
		34	S½SW¼	596.10	Rocky flat and hills	1-2-3	VII	1-2-3	Private
9	1	2	W½NE¼	83.62	Steep hills	1-2-3	VII	1-2-3	Private
		11	NW¼NE¼	40.00	Steep hills	1-2-3	VII	1-2-3	Private
		4	W½NW¼	80.00	Steep hills	1-2-3	VII	1-2-3	Private
		34	SW¼NE¼	40.00	Steep hills	1-2-3	VII	1-2-3	Private
		35	SE¼SE¼, NE¼NE¼, W½NE¼, NE¼NW¼	200.00	Steep hills	1-2-3	VII	1-2-3	Private
10	1	1	W½E½, E½W½	330.12	Mostly flat with drop off	1-2-3	VII	1-2-3	Private
		13	SE¼, NW¼	320.00	Rolling to steep	1-2-3	VII	1-2-3	Private
South	East								
10	1	2	E½SE¼	80.00	Rolling to rough	1-2-3	VII	1-2-3	Private
		28	W½NE¼	80.00	Benchland	1-2-3	VII	1-2-3	Private
11	1	2	NW¼SW¼, W½NW¼, E½W½	283.92	Mountainous	1-2-3	40/VI:243.90/VII	1-2-3	Private
		14	E½NE¼SE¼,E½NE¼SE¼SE¼	25.00	Benchland	1-2-3	VI	1-2-3	Private
		24	NW¼NE¼	40.00	Benchland and canyons	1-2-3	VI	1-2-3	Private
	2	28	NW¼NW¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		29	NE¼NE¼	40.00	Rolling to steep	1-2-3	VII	1-2-3	Private
		29	SW¼NW¼	40.00	Even, gentle slope	1-2-3	VI	1-2-3	Private
		30	E½NE¼	80.00	Even, gentle slope	1-2-3	VI	1-2-3	Private
			TOTAL	108,182.96					

1/ Compiled from records of field surveys and investigations made by the Bureau of Land Management. Land ownership records of this Bureau, and those of the counties were utilized.

2/ Symbols denote land use and suitability: 1. Grazing; 2. Wildlife; 3. Watershed; 4. Crop; 5. Mining; 6. Recreation; 7. Timber; 8. Barren.

3/ Land use capability is explained in Table 14.

4/ Power site withdrawal.

Table 13.- Summary of Proposed Conservation Improvements in the Upper Missouri Basin 1/

PUBLIC DOMAIN	COSTS						BENEFITS					
				Annual Costs								
Type of Improvements	No. Units	Construction	Maintenance	Interest 2½%	Depreciation	Total Annual Cost	Est. Life Years	Inc. Grazing Capacity	Annual Sed. Storage	Water Storage Capacity	Gross On-Site	Benefit Cost Ratio
Stock Water Reservoirs (Each)	35	26,000	1,820	650	1,733	4,203	15		4	61	10,395	2.47-1
Small Diversion Dams (Each)	6	6,000	300	150	600	1,050	10		3	30	1,782	1.70-1
Large Div. and Det. Dams (Each)	2	20,000	1,000	500	1,000	2,500	20		20	200	594	.24-1
Wells (Each)	33	105,600	2,112	2,640	3,017	7,769	35				9,801	1.26-1
Springs (Each)	22	16,500	1,155	413		1,568					6,534	4.17-1
Reseeding (Acres)	715	8,150		204		204		110			220	1.08-1
Public Camp Site (Each)	6	9,000	900	225		1,125						
Brush Removal (Acres)	23,151	144,824		3,621		3,621		2,415			4,830	1.33-1
Rodent Control (Acres	50	25		1		1		10			20	20.00-1
Water Spreading (Acres)	3,601	39,611	1,981	990		2,971		1,800	300	1,800	3,600	1.21-1
Contour Furrow (Acres)	395	2,370	119	60		179		119	33	131	138	.77-1
Check Dams (Each)	94	20,680		517	2,068	2,585	10		16	94	4,653	1.80-1
Truck Trails (Miles)	24.5	24,500	4,900	613		5,513					44,957	8.15-1
Fences (Miles)	62	49,600	1,240	1,240	4,960	7,440	10					
Sub-Total		$472,860	$15,527	$11,824	$13,378	$40,729		4,454	376	2,316	$87,524	2.15-1
STATE AND PRIVATE												
Stock Water Reservoirs (Each)	15	8,500	595	340	567	1,502	15		1	19	4,455	2.97-1
Small Diversion Dams (Each)	1	1,000	50	40	100	190	10		1	5	297	1.56-1
Large Div. and Det. Dams (Each)	2	20,000	1,000	800	1,000	2,800	20		20	200	594	.21-1
Wells (Each)	8	25,600	512	1,024	731	2,267	35				2,376	1.04-1
Springs (Each)	27	20,250	1,418	810		2,228					8,019	3.60-1
Reseeding (Acres)	16,273	162,730		6,509		6,509		3,810			7,620	1.17-1
Public Camp Site (Each)	1	500	50	20		70						
Brush Removal (Acres)	23,799	152,250		6,090		6,090		3,175			6,350	1.04-1
Water Spreading (Acres)	3,158	34,738	1,737	1,390		3,127		1,579	263	1,579	3,158	1.01-1
Check Dams (Each)	45	9,900		396	990	1,386	10		7	45	2,228	1.61-1
Truck Trails (Miles)	20.5	20,500	4,100	820		4,920					37,589	7.64-1
Road Bars (Each)	20	200	50	8	20	78	10				80	1.03-1
Fences (Miles)	11	8,600	215	344	860	1,419	10					
Sub-Total		$464,768	$9,727	$18,591	$4,268	$32,586		8,564	292	1,848	$72,766	2.23-1
GRAND TOTAL		$937,628	$25,254	$30,415	$17,646	$73,315		13,018	668	4,164	$160,290	2.19-1

1/ Determined by field investigation, Bureau of Land Management, 1949-1952. Location of the proposed improvements is shown on the Land Classification map of this report.

Table 14 Description and definitions of land-use capability classes 1/

Class	Suitable for	Topography		Characteristic Native Vegetation	Soil Characteristics						Vulnerability to Erosion	Requisite Special Practices
		Slope (percent)	Character of Surface		Texture	Depth	Relative Salinity	Fertility	Productivity	Drainage		
I	Best type of farming land	0 to 2	Level or nearly level	Tall and mid-grasses, thrifty sagebrush, deciduous trees	Medium; Friable	12" or more; subsoil 36" or more	Negligible	High	Good to High	Good to Excellent	Low	None to minor
II	Farming with simple conservation practices	0 to 10	Irregular	Tall, mid, and short grasses; big sagebrush, deciduous trees	Light to Heavy; Friable	8" or more; subsoil 36" or more	Negligible to slight	Good to High	Moderate to High	Good	Slight to moderate	Minor to simple practices
III	Farming with complex conservation practices	0 to 10	Irregular	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, and deciduous trees	Light to Heavy; Friable	6" or more; subsoil 24" or more	Slight to moderate	Fair to Good	Moderate to High with management	Often poor; may be needed	Moderate to High	Complex practices essential
IV	Limited or occasional cultivation; best for permanent hay or pasture	0 to 15	Irregular or stony	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat	Sandy to Clay; porous or tight	6" or more; may have shallow hardpan	Negligible to critical	Poor to Good	Poor for row crops; best for hay and pasture	Not justifiable if needed	Moderate to High or nil	Complex and intensive practices with good management
V	Range or woodland; farming only if irrigation water becomes available	0 to 5	Smooth to irregular; may be stony or wet	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, and deciduous trees	Light to Heavy; Friable	Good permeability to 24" depth	Negligible to moderate	Good to High	Moderate to High	Usually not a problem	Low	None to minor or drainage
VI	Range and woodland only	0 to 20 (greater only on good soils)	Irregular to rough or rocky	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat	Very Light to Heavy	Shallow to moderate; permeability excessive to poor	Negligible to moderate	Fair to Good	Light to Moderate;	Not practicable if a problem	Moderate	Proper management with simple restrictions
VII	Range and woodland with severe restrictions	0 to 100	Rough, rocky, or eroded	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat, mountain browse and annuals	Any: May be tight clay or open sand or gravel	Often shallow, poorly developed	Negligible to critical	May be Poor	Poor to Light	Seldom a problem or not practicable	High	Proper management with complex restrictions and intensive practices
VIII	Watershed, wildlife and recreation	Generally steep or swampy	Extremely rough, barren or inaccessible	Often only annuals or scanty perennials; may be dense coniferous timber	Usually poorly developed	Very shallow or nil	May be excessive for plant growth	Usually very low	Usually very low or nil	Often poor; not justifiable if a problem	High (unless a swamp)	Complete protection

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1/ Adapted from Soil Conservation Service Standards, U. S. Department of Agriculture. Any one of the factors listed may classify a soil, factors determining classification singly, not necessarily in combination.

Description and definitions of soil erosion condition classes

Erosion Class	Description of degree of erosion	Sheet Erosion [1]	Wind Erosion [1]	Gully Erosion [1]
1	None to Slight	0-10 percent of topsoil removed. Little apparent evidence of surface erosion and then only localized areas too small to delineate into Class 2. Vegetation often climax type. Generally smooth to gently undulating plains and forested lands; dominantly 0-3 percent slopes.	None to only local evidence of slight soil drift or surface soil removal. 0-10 percent of topsoil removed. Soil usually well protected by sod or plant litter.	No evidence of active gullying. All waterways well established.
2	Slight to Moderate	10-25 percent of topsoil removed, but with little evidence of vegetation breaking up. Slopes generally moderate; characterized by climax type of vegetation with few annual weeds and of usually lower density than vegetation in Class 1 above.	Local evidence of slight to moderate soil drifting and surface soil removal and/or accumulation. Most soil types, particularly the silty and fine sandy textured soils under certain conditions of culture and drought combined with high winds, are subject to this form of soil deterioration.	Occasional active gullies which are usually shallow, occuring primarily along main watercourses at intervals of more than 100 feet. In open areas and where slopes permit, little difficulty in traversing the area in a car.
3	Moderate to Severe	25-50 percent of topsoil removed. "Cat steps" and terraces noticeable on slopes which may be moderate to steep. Bare spots are quite common. Undesirable weeds and plants are beginning to dominate the vegetation with climax types more often scattered than dominant. Perennial woody plants frequently pedestalled. Subsoil rarely exposed except in localized areas.	Bare spots common and areas generally more consistently subject to damage by soil blowing. Soils often removed to depths of 1 to 4 inches and drift accumulations and hummocks noticeable. Sod grass deterioration and plant pedestals in evidence and plant cover is insufficient for soil protection. Subsoil occasionally exposed and soils containing gravel show pavement appearance.	Occasional gullies shallow or deep occuring at intervals of more than 100 feet apart. Concentration of run-off and drainage channeling generally due to steepness of slope. Main water courses deeply channeled, generally U-shaped with tributaries usually V-shaped. Moderate difficulty in traversing area in car, ordinarily having to "head" gully in crossing. Generally associated with extensive shoe-string or rill gullying.
4	Severe to Critical	50-100 percent of topsoil removed and subsoil may be exposed in many places and is being removed to varying depths. Bare spots and trampled out areas common and plant pedestalling and erosion pavement highly evidenced. Loss of surface soil may be complete, associated with active gullying and high mortality of climax species of vegetation. Annual and perennial invaders may dominate the vegetation.	Majority of topsoil may be removed; usually accompanied by destructive accumulations in form of hummocks and dunes particularly along such obstructions as fences and edges of drainageways. Perennial vegetation often scanty and extensively pedestalled.	Frequent, usually shallow, gullies occuring at intervals of less than 100 feet apart. Main waterways deeply channeled and undergoing active gullying, usually U-shaped. Areas often incised by shoestring gullies and rills but are not generally so numerous or deep as to destroy the land completely but dissection permits rapid drainage of surface water. Corduroyed surface makes car travel impossible.
5	Critical to Extreme	Usually all the surface soil has been removed and utility and productivity of land has been largely destroyed by advanced stages of gully erosion which usually continues and retirement from use is, therefore, mandatory. Barren wastelands are often in this class. Desirable perennials never have occupied the area or have been practically obliterated and low density of annuals usually predominates.	Represents a condition of soil deterioration amounting to essential destruction. Retirement from further use is mandatory and artificial treatment is often essential to soil stabilization. Constantly shifting dunes are common. Deep fine sandy soils usually predominate in areas so classified.	Frequent and deep gullies. Generally represents maximum destruction by erosion. Complete and rapid drainage of surface water and soil moisture effected through intricate dissection of soil by gullies. Deeply channeled waterways with edges broken and caved in. Gully banks, slopes and bottoms in active erosion stage.

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[1] The erosion condition and proposed improvement map utilizes three numbers in series to show the degree of erosion in each of the three types of erosion in this order: sheet, wind, gully. An example would be 3 - 2 - 1.

Description and definitions of Land Resource Condition Classes 1/

Principal Characteristics Affecting Condition of Range Resource

Condition Class and Map Symbol	Soils		Vegetation		
	Fertility	Erosion	Presence or absence of inferior species	Vigor	Relative Productivity
Excellent "E"	Good soil, limited by climatic conditions.	No apparent accelerated soil erosion by wind or water and no recent accumulation of silt or debris.	An absence of "invader" species of inferior utility.	Vigorous condition and good reproduction of the more valuable native vegetation.	Maximum (optimum) or near maximum production of high quality vegetation during normal years.
Good "G"	Slightly reduced soil fertility and loss of organic matter and tilth.	Only very minor accelerated sheet and shoe-string erosion or possibly some blowing and minor accumulations.	Slightly increased abundance of inferior species and "invader" plants.	Slightly reduced vigor and reproduction of desirable native vegetation; decreased density of vegetative cover.	Reduced production to between 75 and 90 percent of optimum.
Fair "F"	Moderately to severely depleted soil fertility; poor tilth.	Advanced accelerated erosion evidenced by some gullies, moderate sheet erosion and topsoil loss.	Predominance of less desirable plants. Decided increase of "invader" species.	Moderately reduced vigor and abundance and little or no reproduction of more desirable native vegetation; generally decreased density of perennial cover.	Reduced productivity to between 50 and 75 percent of optimum.
Poor "P"	Severely depleted soil fertility, poor tilth.	Excessive rapid run-off with heavy silt loam, greatly accelerated soil erosion evidenced gullying; topsoil may be lost, subsoil exposed.	Predominance of inferior perennial species or annual vegetation.	Greatly reduced vigor and density of perennial vegetation; most desirable native species may be absent or have high mortality; reproduction absent.	Productivity reduced below 50 percent of optimum.

1/ Under proper range management a high good condition would be the maximum condition attained. Excellent condition is limited to undergrazed, inaccessible and relict areas.

UNITED STATES
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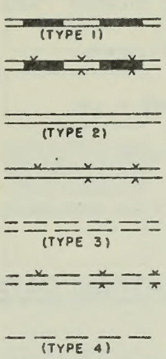
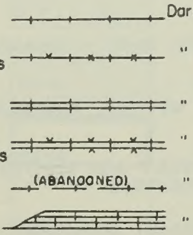
MAP SYMBOLS

ROADS



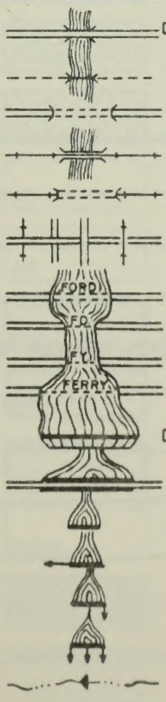
		WHEN LITHOPRINT IN COLOR
* HARD SURFACE, Heavy duty (All Weather Traffic)		Dark Gray
HARD SURFACE, Fenced	1 SIDE 2 SIDES	" "
IMPROVED DIRT, (Graded, drained and maintained)		" "
IMPROVED DIRT, Fenced	1 SIDE 2 SIDES	" "
UNIMPROVED DIRT, (Not maintained)		" "
UNIMPROVED DIRT, Fenced	1 SIDE 2 SIDES	" "
TRAIL, Jeep		" "

RAILROADS



SINGLE TRACK		Dark Gray
SINGLE TRACK, Fenced	1 SIDE 2 SIDES	" "
DOUBLE TRACK		" "
DOUBLE TRACK, Fenced	1 SIDE 2 SIDES	" "
ABANDONED TRACK		" "
YARDS or SIDINGS		" "

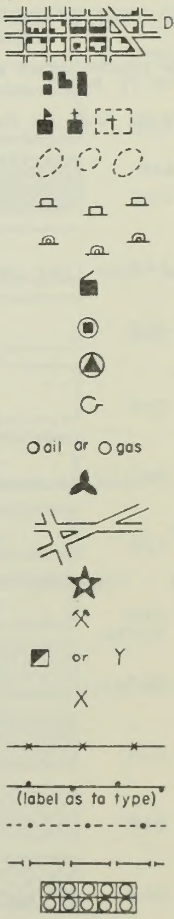
BRIDGES-TUNNELS-CROSSINGS-DAMS



BRIDGE, HIGHWAY	Dark Gray	
FOOTBRIDGE	" "	
TUNNEL, HIGHWAY	" "	
BRIDGE, RAILROAD	" "	
TUNNEL, RAILROAD	" "	
OVERPASS and UNDERPASS	" "	
FORD, ROAD	" "	
FERRY	" "	
LARGE MASONRY or EARTH DAM	Dark Gray	Dams Only
DAM CARRYING ROAD	" "	
IMPORTANT SMALL MASONRY or EARTH	" "	
DIVERSION DAM	" "	
RETENTION DAM	" "	
DETENTION DAM	" "	
CHECK DAM or GULLY PLUG	" "	

* When graveled indicate (Gravel)

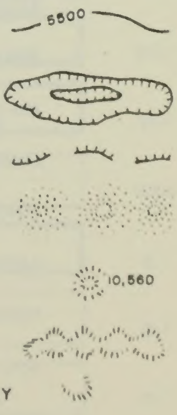
MISCELLANEOUS CULTURE SYMBOLS



	WHEN LITHOPRINT IN COLOR
CITY or TOWN	Dark Gray
BUILDINGS	" "
SCHOOL-CHURCH-CEMETERY	" "
PREHISTORIC RUINS	" "
CLIFF DWELLINGS	" "
INDIAN HOGAN	" "
FIRE TOOL CACHE	" "
FIRE WARDEN HEADQUARTERS	" "
FIRE LOOKOUT STATION	" "
CORRAL	" "
WELLS, other than water (label type)	" "
EMERGENCY LANDING FIELD	" "
AIRPORT	" "
AIRWAY BEACON LIGHT	" "
OPEN PIT or QUARRY	" "
SHAFT-TUNNEL ENTRANCE	" "
MINE PROSPECT	" "
FENCE	" "
TELEPHONE or TELEGRAPH LINE	" "
POWER TRANSMISSION LINE	" "
PIPE LINE	" "
OIL TANK FARM	" "

Note: "A" added to any symbol indicates abandonment

HYPSOGRAPHIC FEATURES



INDEX CONTOURS	" "
DEPRESSION CONTOURS	" "
BLUFFS or CLIFFS (Barrier to livestock)	" "
SAND DUNES	" "
PROMINENT PEAK	" "
PROMINENT RIDGE TOP	" "
HACHURES INDICATING TOPOGRAPHY	" "

(CONTINUED)

CONTINUED

HYDROGRAPHIC FEATURES

		WHEN PRINTED IN COLOR
PERENNIAL STREAMS		BLUE
INTERMITTENT STREAMS		"
STREAM DISAPPEARING AT A DEFINITE POINT		"
SANDWASH, Wide and dry		"
SAND BAR		"
LAKE		"
INTERMITTENT LAKE OR POND		"
SALT LAKE		"
MARSH		"
DIKE		"
CANAL, FLUME OR AQUEDUCT		"
SPRING	○→	"
SPRING (Improved)		"
WELL, WATER	●	"
ARTESIAN WELL		"

HYDROGRAPHIC FEATURES

		WHEN PRINTED IN COLOR
WINDMILL		Circle in blue only
WATER STORAGE TANK	⊢○	"
WATER TROUGH		Inside trough blue
PUMPING PLANT	■–○	Circle in blue only
RESERVOIR		Back water blue
GLACIER OR PERMANENT SNOWFIELD		Blue

CONTROL DATA

TRIANGULATION STATION	△	Dk. grey
BENCH MARK (Permanent)	BM X 958	" "
BENCH MARK (Temporary)	X 624	" "
U.S. MINERAL MONUMENT	▲	" "
TOWNSHIP AND SECTION CORNERS RECOVERED	+	" "
BOUNDARY MONUMENT	⊡	" "

BOUNDARIES

		WHEN PRINTED IN COLOR
NATIONAL		DARK GRAY
STATE		" "
COUNTY		" "
RESERVATION, NATIONAL OR STATE		" "
GRAZING DISTRICT		(RED)
MAJOR WATERSHED		DARK GRAY
LAND GRANT		" "
TOWNSHIP LINE	———————	" "
SECTION LINE	———————	" "
SUBDIVISION LINE	— — — — — — —	" "
SOIL CONSERVATION DISTRICT		(BLUE)
UNIT OR ALLOTMENT		(RED)

UNITED STATES
DEPARTMENT OF THE INTERIOR
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REGION III

LAND OWNERSHIP SYMBOLS

FOR LITHOPRINTED MAPS				FOR AREA MANAGER'S ACETATE RECORDS			
DESCRIPTION	SYMBOL	COLOR	ZIP NO	COLOR	SYMBOL	PENCIL NO.	
						MONGOL	PRISMACOLOR
PUBLIC DOMAIN (unreserved, unappropriated)	V	BUFF	Solid	RED (Outline)	V	866	926
STOCK DRIVEWAY	SD	BUFF	54	BROWN	SD	863	946
STATE	S	BLUE	Solid	BLUE (Solid)	S	845	905
CAREY ACT (Segregated but not patented to State)	CA	BLUE	70	BLUE (Solid)	CA	845	905
CAREY ACT (Patented to State)	S-CA	BLUE	70	BLUE (Solid)	S-CA	845	905
CAREY ACT (Patented from State to Bonafide Settlers)	P-CA	BLUE	70	BLUE (Outline)	P-CA	845	905
STATE or COMMUNITY FOREST	Name	GREEN	70	GREEN	Name	868	909
STATE GRAZING	Name	BLUE	Outline	BLUE	Name	845	905
PUBLIC WATER RESERVE	PWR	RED	Solid	ORANGE	PWR	862	918
RECLAMATION WITHDRAWAL	RW	ORANGE	54	BLUE	RW	845	905
RECLAMATION ACQUIRED LANDS	P-RW	ORANGE	22	BLUE	P-RW	845	905
RESERVOIR WITHDRAWAL	R	ORANGE	22	BLUE	R	845	905
POWERSITE WITHDRAWAL	PS	RED	Solid	BLACK (Outline)	PS	849	935
AIR NAVIGATION AREA	AN	DARK GREY	Solid	BLACK (Outline)	✈	849	935
MILITARY WITHDRAWAL	MW	RED	Outline & 70	PURPLE (Outline)	MW	864	931
MILITARY RESERVATION	MR	RED	Outline & 70	PURPLE (Outline)	Name	864	931
MILITARY PURCHASE	MP	RED	Outline & 70	PURPLE (Solid)	W-P	864	931
INDIAN RESERVATION	Name	YELLOW	Solid	YELLOW (Outline)	Name	817	916
INDIAN TRUST ALLOTMENT	IA	YELLOW	54	YELLOW (Solid)	IA	817	916
INDIAN CEDED LAND	IC	YELLOW	70	YELLOW (Solid)	IC	817	916
WILDLIFE RESERVATION	NL or Name	PURPLE	Solid	PURPLE	WL	864	931
P D WITHIN WILDLIFE RESERVATION	V-WL	BUFF	Solid	PURPLE	V-WL	864	931

CONTINUED

CONTINUED

LAND OWNERSHIP SYMBOLS

FOR LITHOPRINTED MAPS				FOR AREA MANAGER'S ACETATE RECOR			
DESCRIPTION	SYMBOL	COLOR	ZIP NO.	COLOR	SYMBOL	PENCIL N	
						MONGOL	PRISMA
WILDLIFE REFUGE	WR or name	PURPLE	Solid	PURPLE	▨ WR	864	93
P.D. WITHIN WILDLIFE REFUGE	V-WR	BUFF	Solid	PURPLE	▨ V-WR	864	93
GAME RANGE	GR	PURPLE	Solid	PURPLE	▨ Name	864	93
NATIONAL PARK & MONUMENTS	▨ NP or name	PURPLE	54	PURPLE (Solid)	Name	864	93
NATIONAL FOREST	▨ NF or name	GREEN	54	GREEN (Outline)	Name	868	90
* GOVERNMENT PURCHASE (L.U. Project) (TITLE III)	LU	BROWN	Solid	BROWN (Outline)	LU	863	94
P.D. WITHIN GOVERNMENT PURCHASE (L.U. PROJECT TITLE III)	V-LU	BUFF	Solid	BROWN	▥ V-LU	863	94
GEOLOGICAL STRUCTURE	▨ Name	BLACK	79	BLACK	▨ Name	849	93
COUNTY	☐	BLANK		BLACK	C	849	93
RAILROAD LAND GRANT	☐	BLANK		BLACK	RR	849	93
PATENTED	☐	BLANK		BLANK	☐		
MINERAL CLAIM	MC	BLACK	Thin Outline		☐		
COAL, OIL, MINERALS etc. Reserved to the United States	☐	BLACK	Outline		☐		

* OUTLINE THE ENTIRE L.U. PROJECT WITH A BROWN FEATHERED ▨ OUTLINE.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
AREA 3

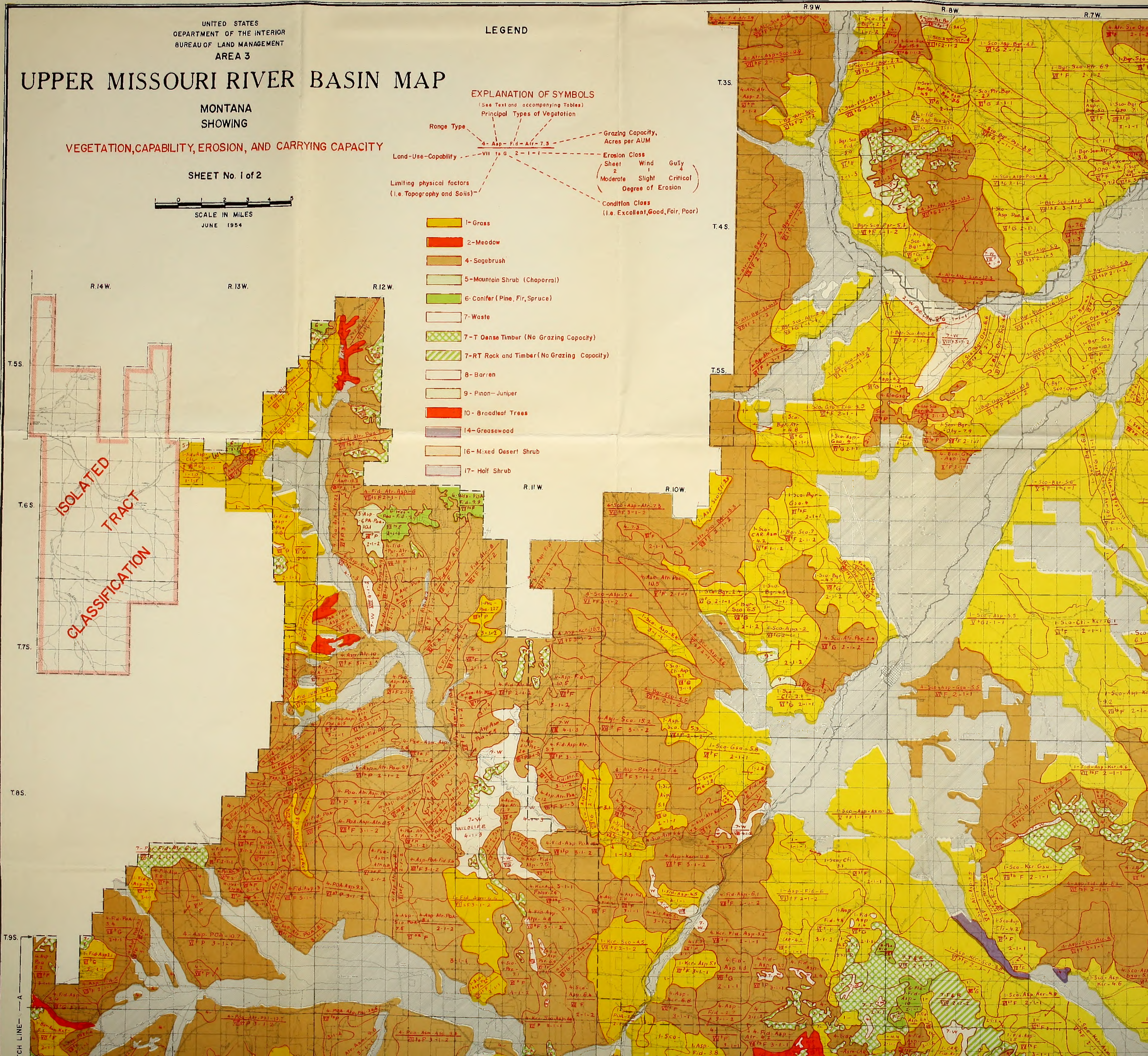
UPPER MISSOURI RIVER BASIN MAP

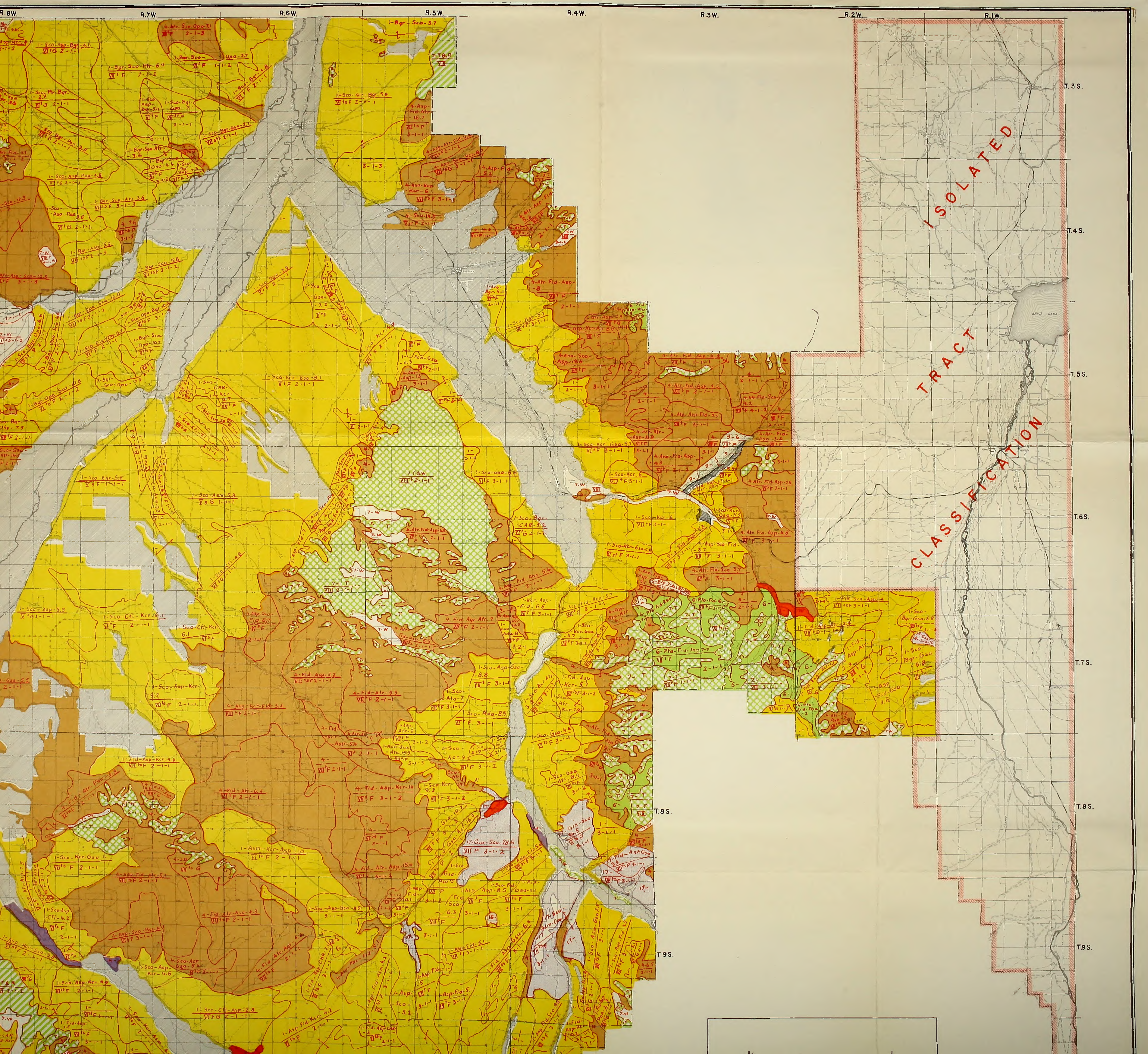
MONTANA
SHOWING

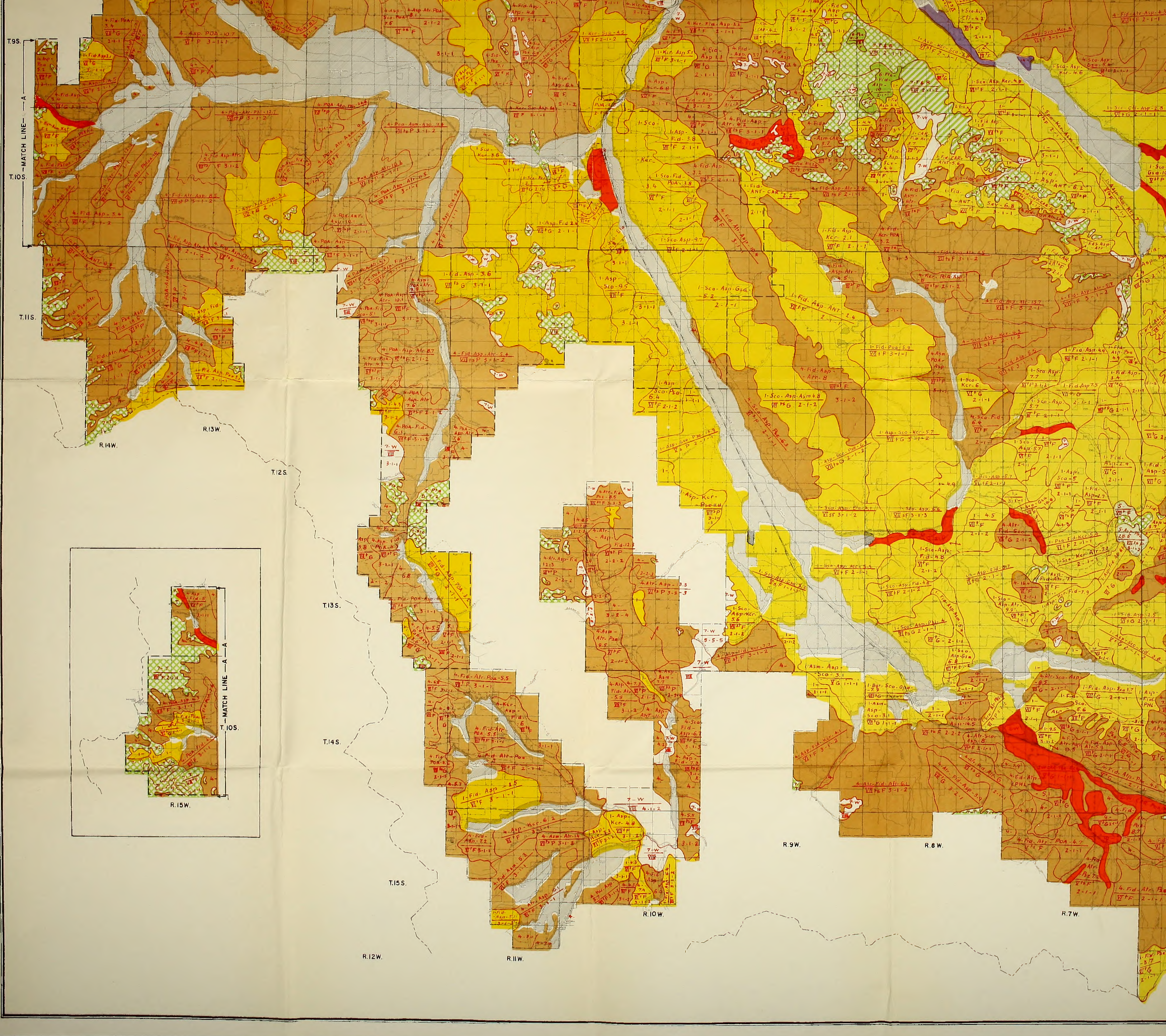
VEGETATION, CAPABILITY, EROSION, AND CARRYING CAPACITY

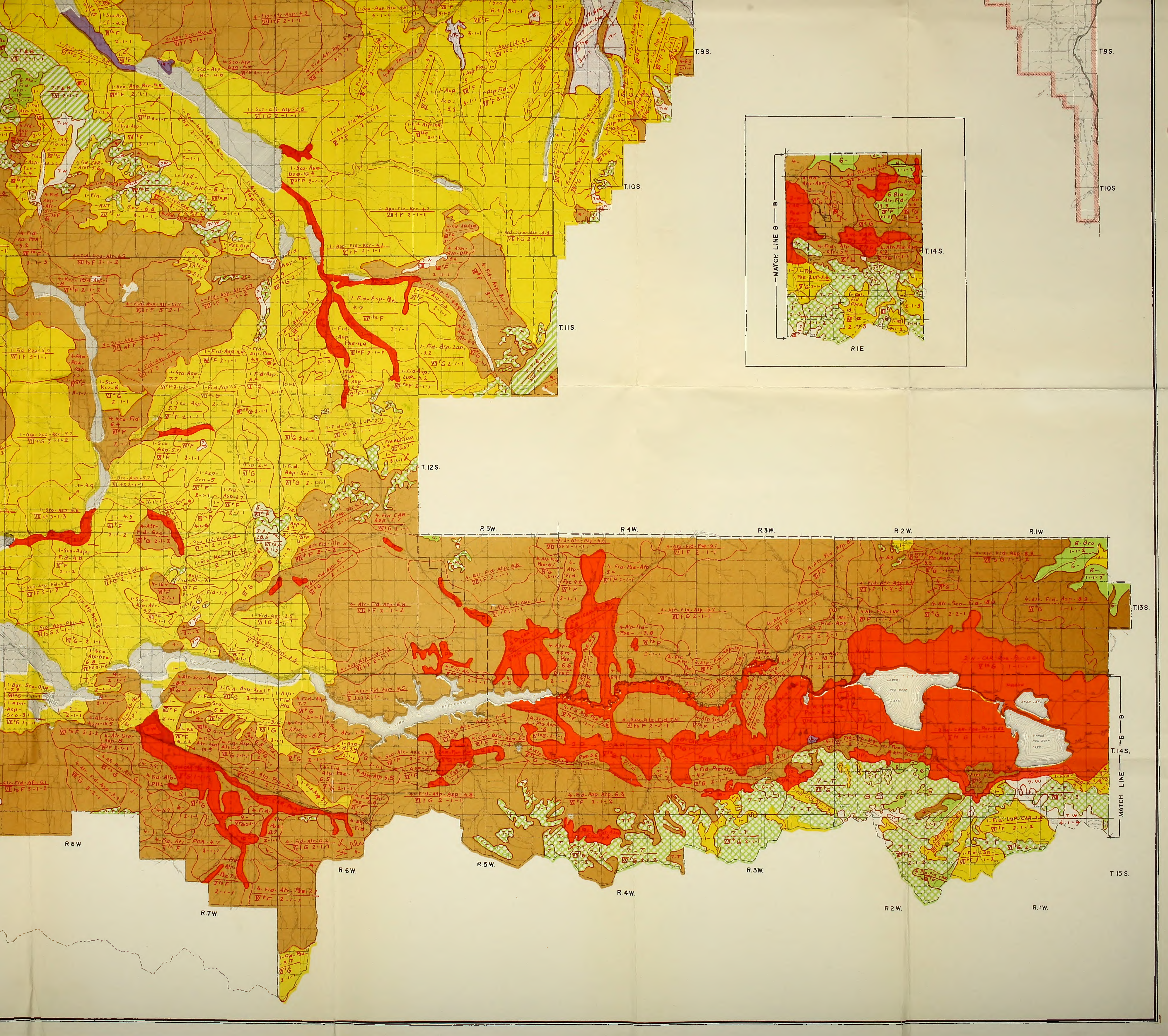
SHEET No. 1 of 2

JUNE 1954




R.8W.
R.7W.
R.6W.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.
T.3S.
T.4S.
T.5S.
T.6S.
T.7S.
T.8S.
T.9S.
ISOLATED
TRACT
CLASSIFICATION


T.9S.
T.10S.
MATCH LINE — A
T.11S.
R.14W.
R.13W.
T.12S.
T.13S.
T.14S.
T.15S.
R.12W.
R.11W.
R.10W.
R.9W.
R.8W.
R.7W.
MATCH LINE — A — A
T.10S.
R.15W.


T.9S.
T.10S.
T.11S.
T.12S.
T.13S.
T.14S.
T.15S.
R.8W.
R.7W.
R.6W.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.
R.1E.
MATCH LINE B — B
LOWER RED ROCK LAKE
UPPER RED ROCK LAKE
SWAN LAKE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
AREA 3

UPPER MISSOURI RIVER BASIN MAP

MONTANA
SHOWING

VEGETATION, CAPABILITY, EROSION, AND CARRYING CAPACITY

SHEET No. 2 of 2

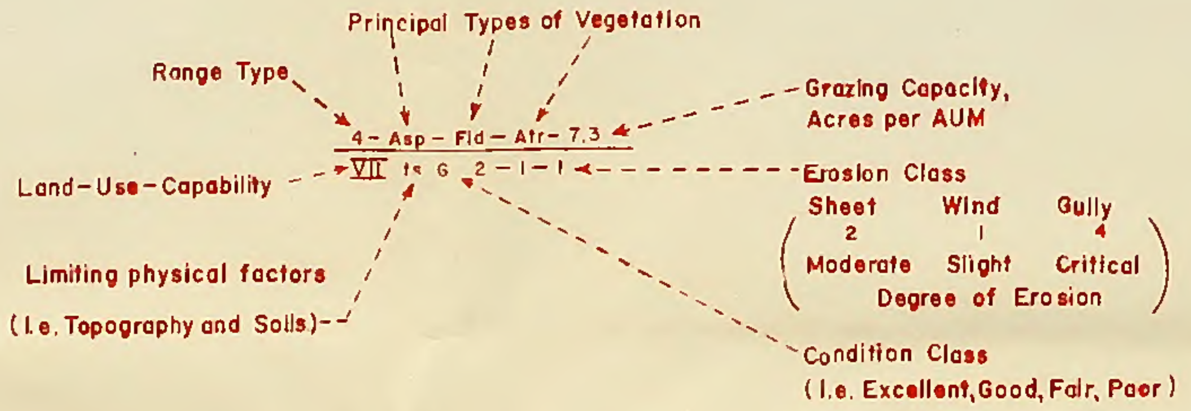
1 0 1 2 3 4 5
SCALE IN MILES
JUNE 1954

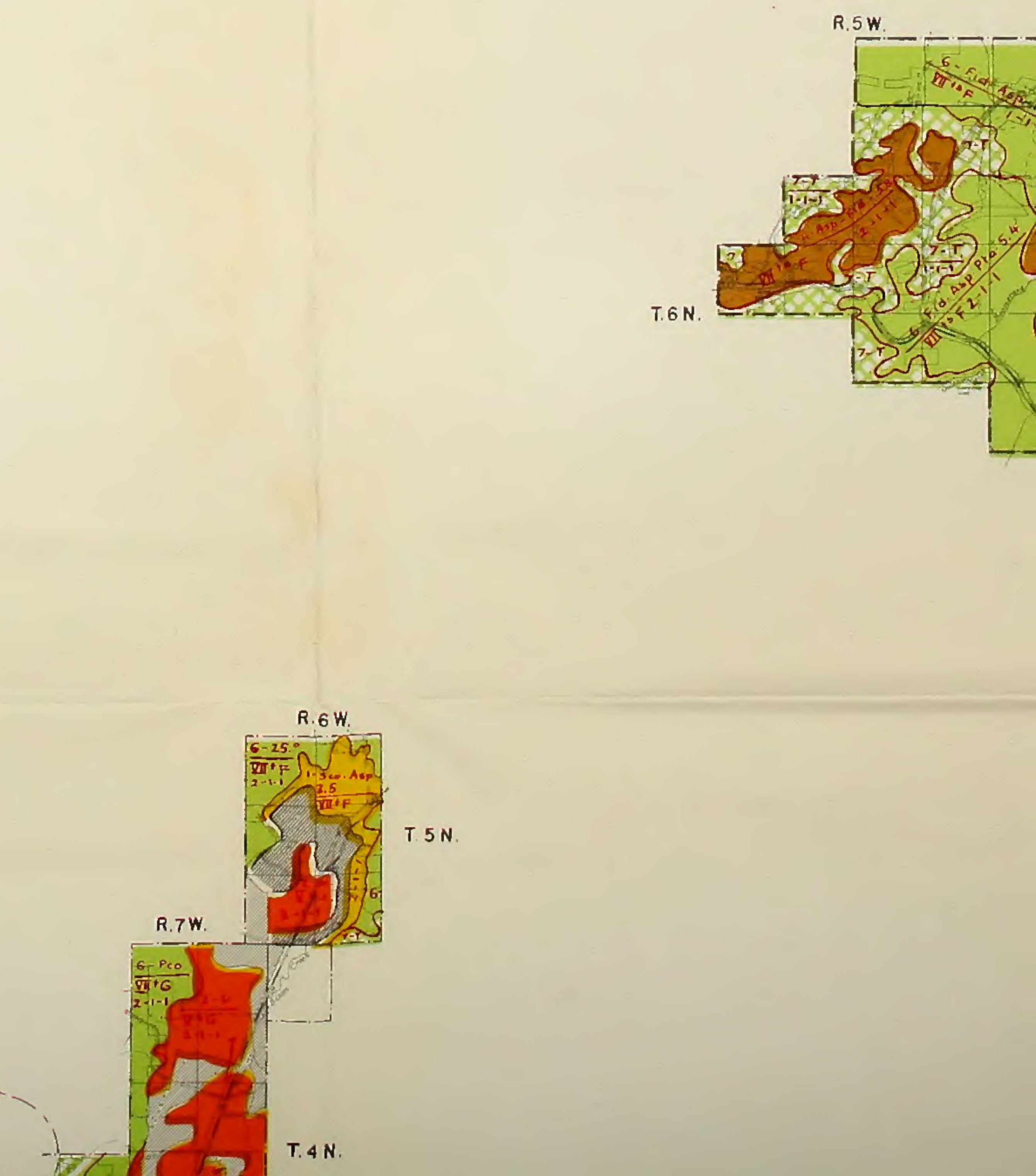
LEGEND

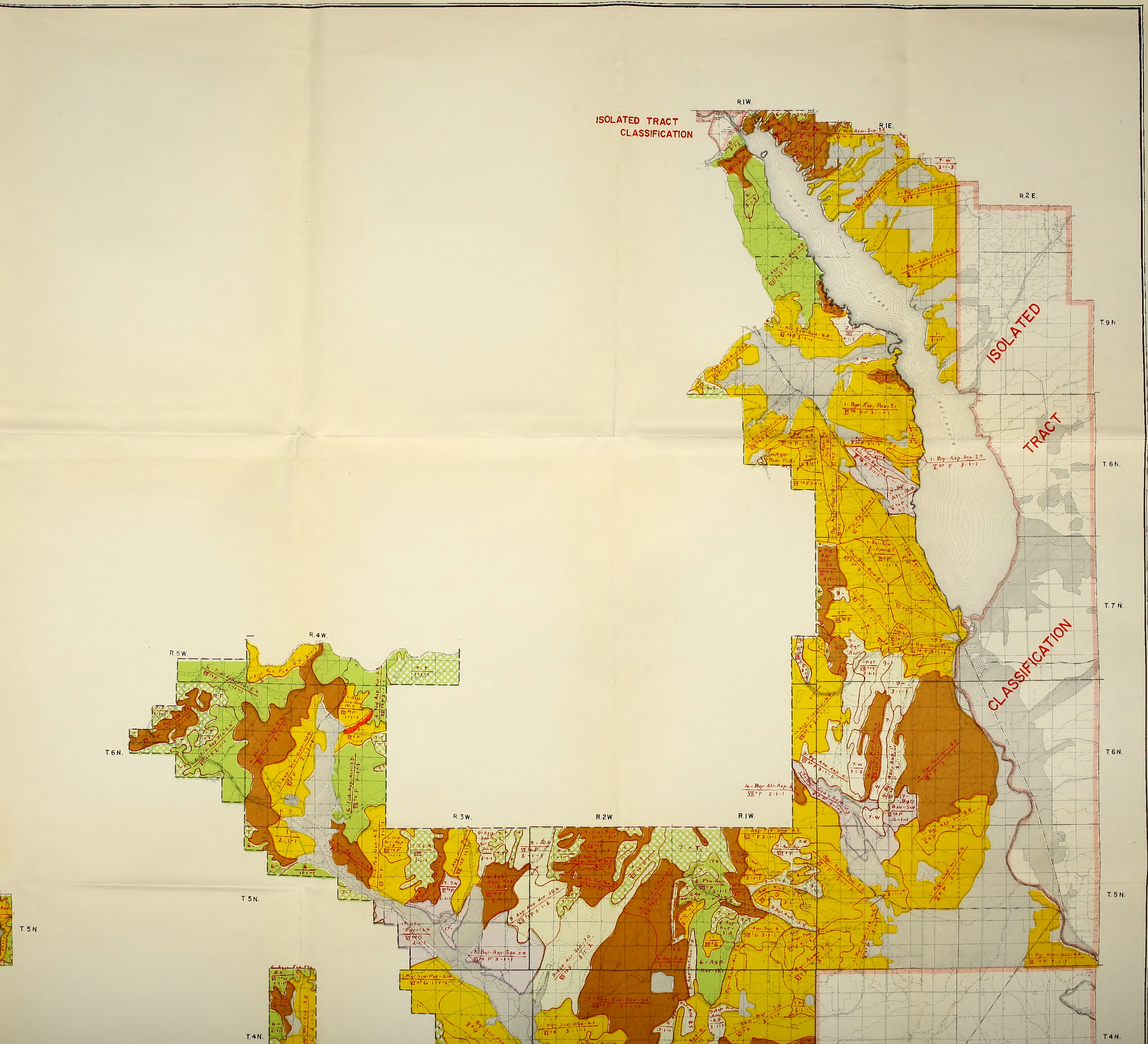
- 🟧 1-Grass
- 🟥 2-Meadow
- 🟫 4-Sagebrush
- ⬜ 5-Mountain Shrub (Chaparral)
- 🟩 6-Conifer (Pine, Fir, Spruce)
- ⬜ 7-Waste
- ▨ 7-T Dense Timber (No Grazing Capacity)
- ▨ 7-RT Rock and Timber (No Grazing Capacity)
- ⬜ 8-Barren
- ⬜ 9-Pinon-Juniper
- 🟥 10-Broadleaf Trees
- 🟪 14-Greasewood
- ⬜ 16-Mixed Desert Shrub
- ⬜ 17-Half Shrub

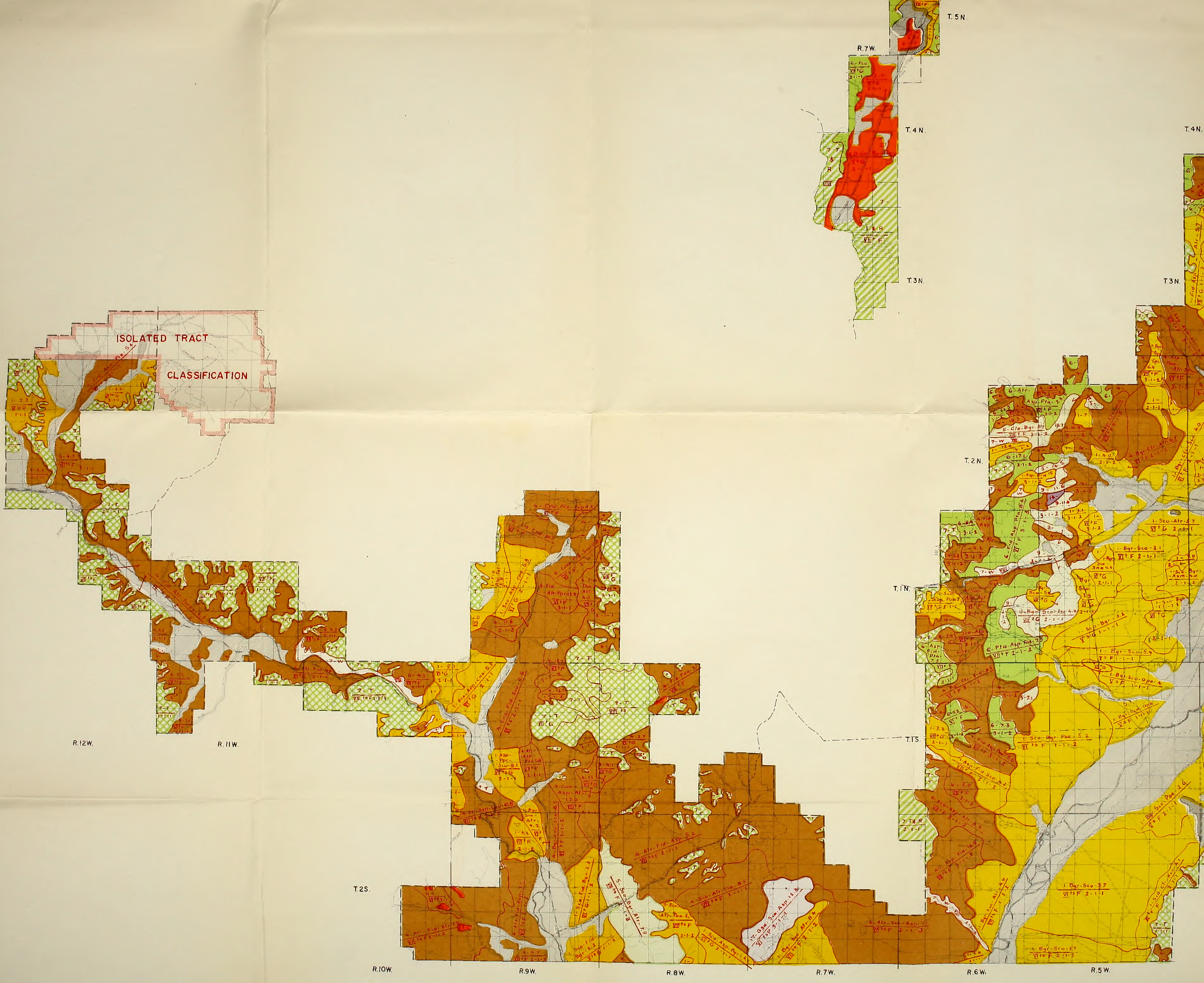
EXPLANATION OF SYMBOLS

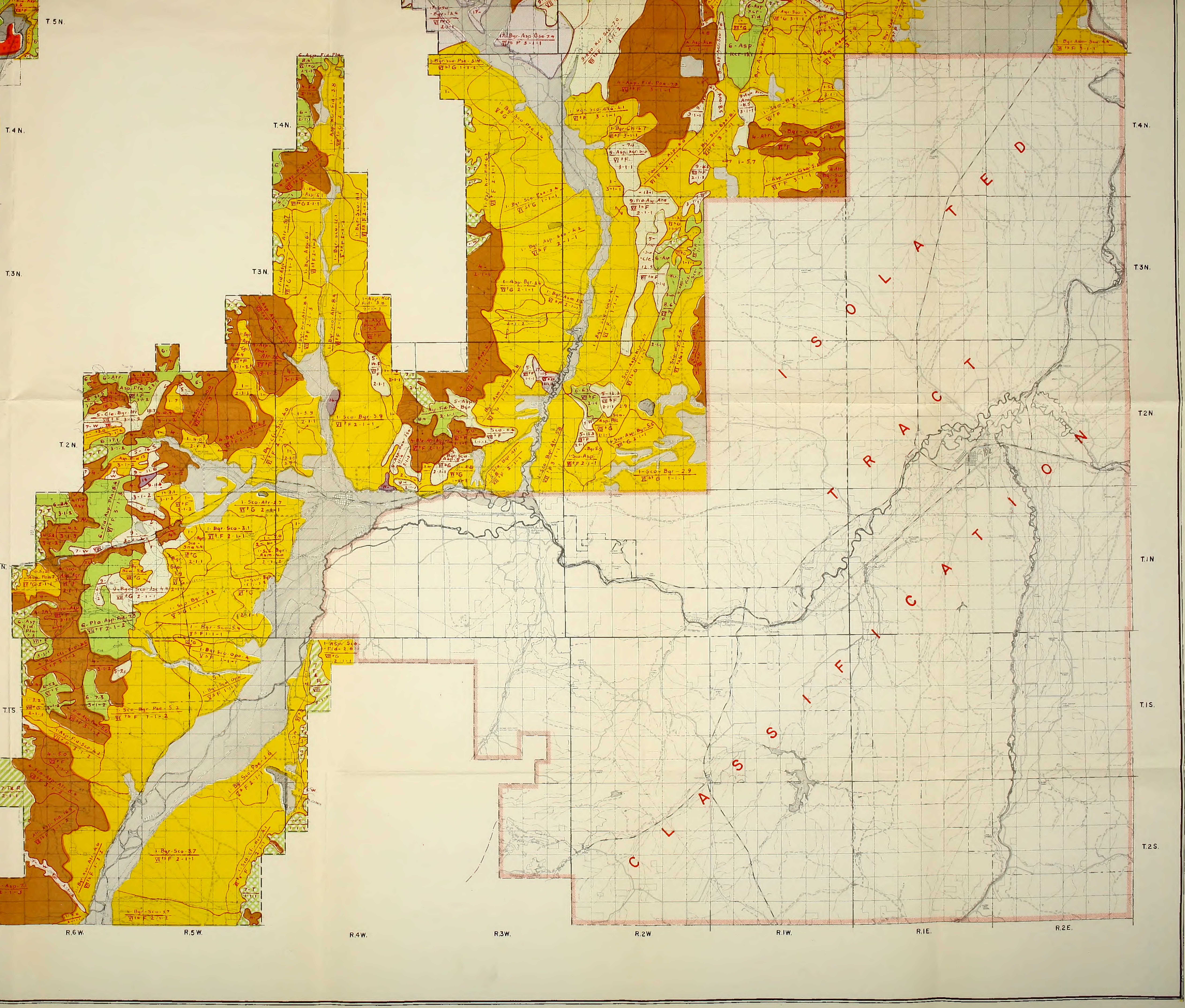
(See Text and accompanying Tables)


Principal Types of Vegetation
Range Type
Grazing Capacity, Acres per AUM
4 - Asp - Fld - Afr - 7.3
Land-Use-Capability
VII ts G 2 - 1 - 1
Erosion Class
Sheet Wind Gully
2 1 4
Moderate Slight Critical
Degree of Erosion
Limiting physical factors
(I.e. Topography and Soils)
Condition Class
(I.e. Excellent, Good, Fair, Poor)




ISOLATED TRACT
CLASSIFICATION
ISOLATED TRACT CLASSIFICATION
CANYON FERRY RESERVOIR
R.1W.
R.1E.
R.2E.
R.4W.
R.5W.
R.3W.
R.2W.
R.1W.
T.9N.
T.8N.
T.7N.
T.6N.
T.6N.
T.5N.
T.5N.
T.5N.
T.4N.
T.4N.
1-Bgr-Asp-Poa-5.1
1-Bgr-Asp-Sco-2.7
1-Bgr-Sco-Gsa-4.1
4-Bgr-Atr-Asp-
17-Bgr-Gsa-Atr-Asp-
7-W
7-T
Bgr-Asm-Sco-4.4
4-Asp-Fid-Poa-7.2


T.5N.
R.7W.
T.4N.
T.4N.
T.3N.
T.3N.
ISOLATED TRACT
CLASSIFICATION
T.2N.
T.2N.
T.1N.
T.1N.
T.1S.
R.12W.
R.11W.
T.2S.
R.10W.
R.9W.
R.8W.
R.7W.
R.6W.
R.5W.



T.5N.
T.4N.
T.4N.
T.4N.
T.3N.
T.3N.
T.3N.
T.2N.
T.2N.
T.1N.
T.1S.
T.1S
T.2S.
R.6W.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.
R.1E.
R.2E.
ISOLATED TRACT CLASSIFICATION
1-Bgr-Sco-3.7
1-Sco-Bgr-3.9
1-Bgr-Sco-3.1
1-Sco-Bgr-2.9
Sco-Bgr-Poe-5.2
1-Bgr-Sco-Poe-1.6
1-Sco-Atr-2.7
1-Bgr-Sco-5.9

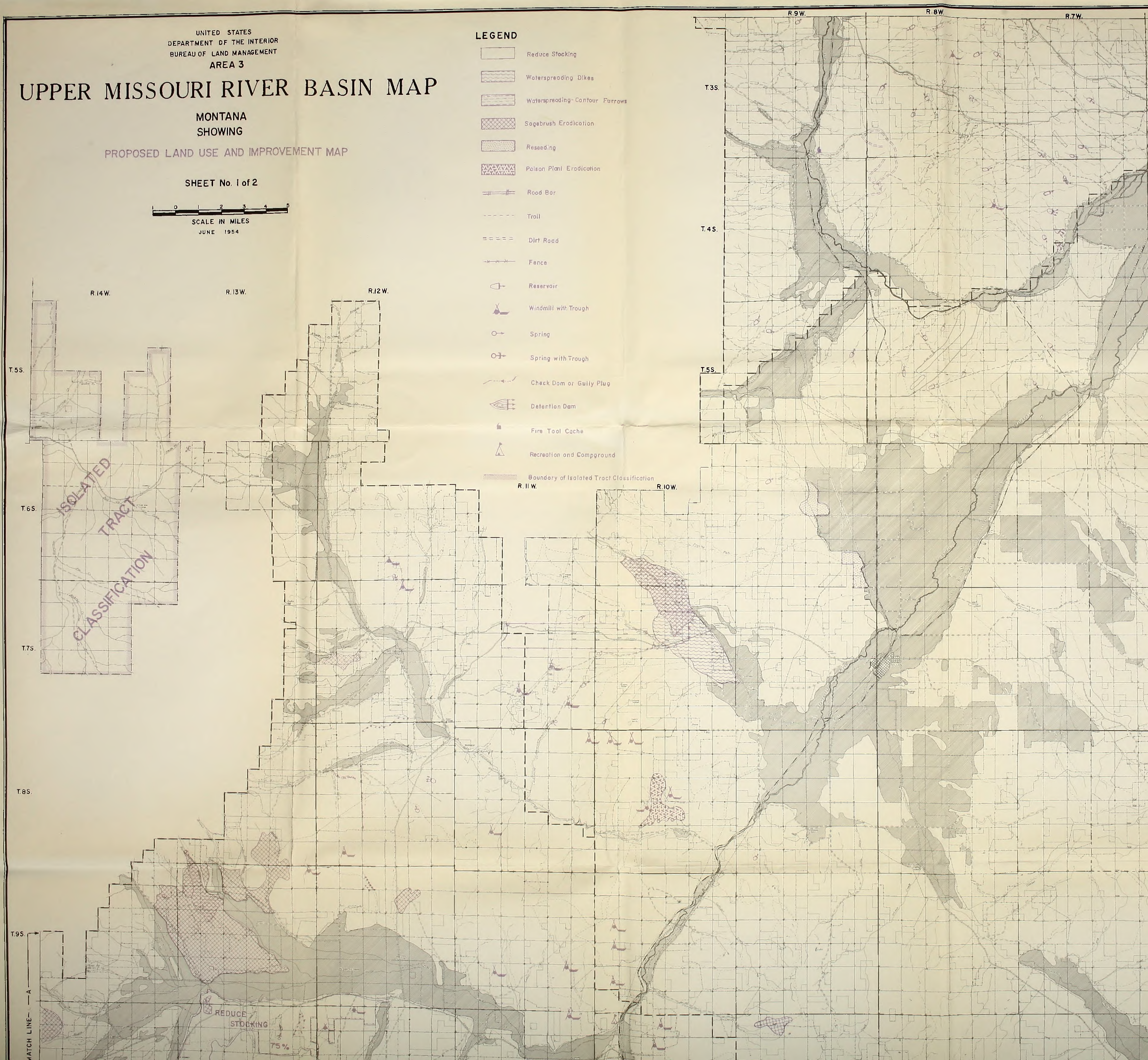
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
AREA 3

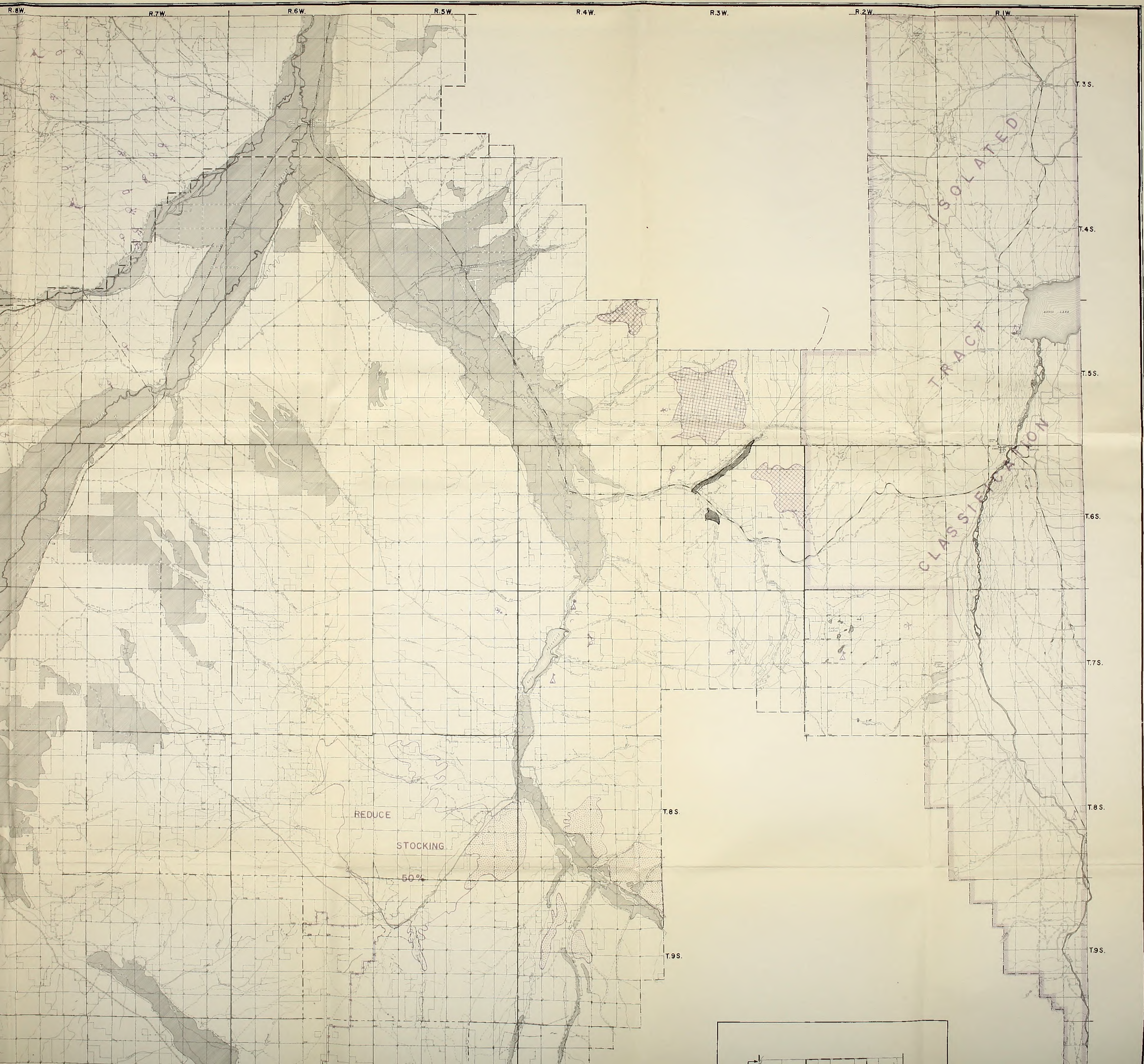
UPPER MISSOURI RIVER BASIN MAP

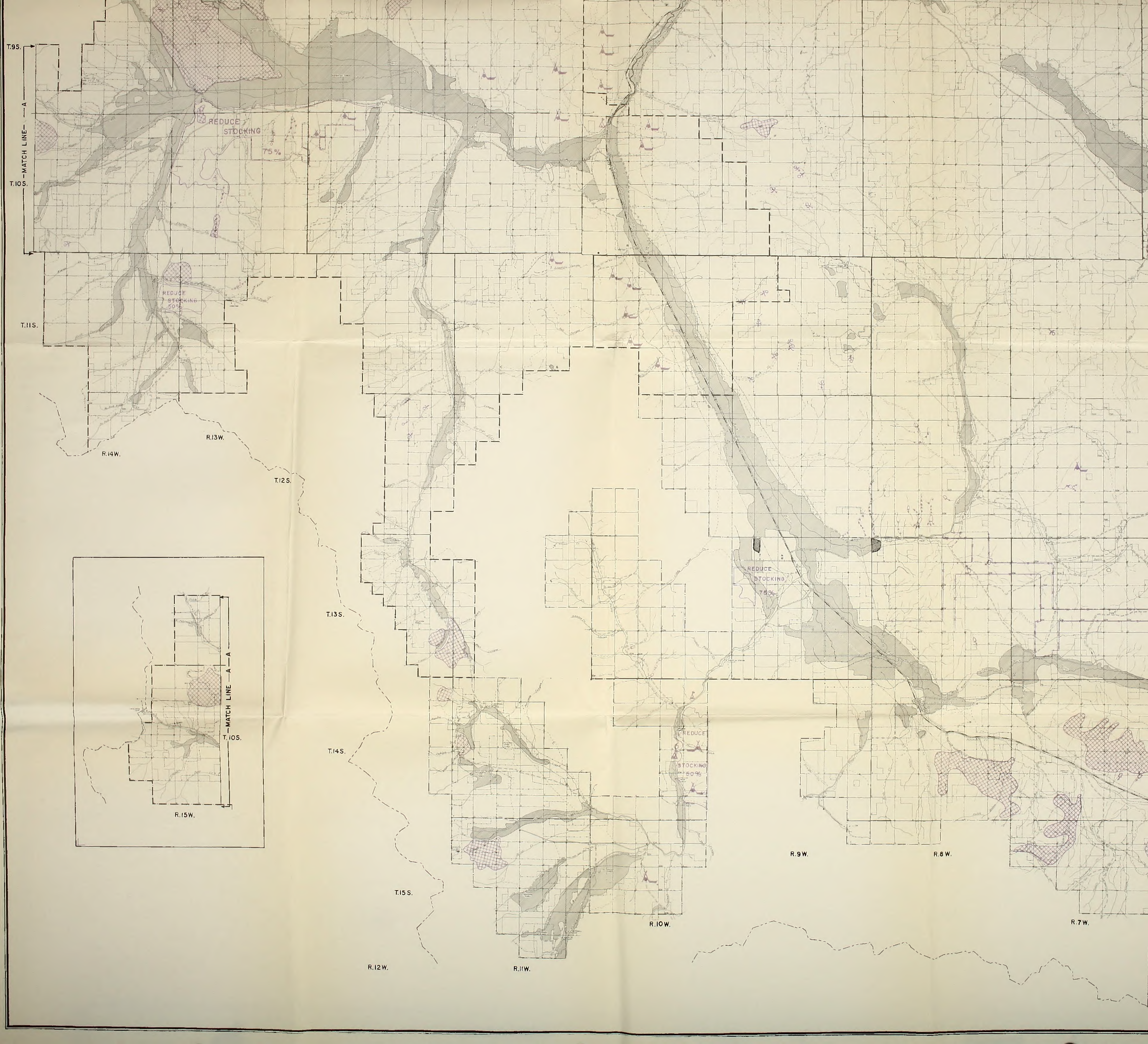
MONTANA
SHOWING

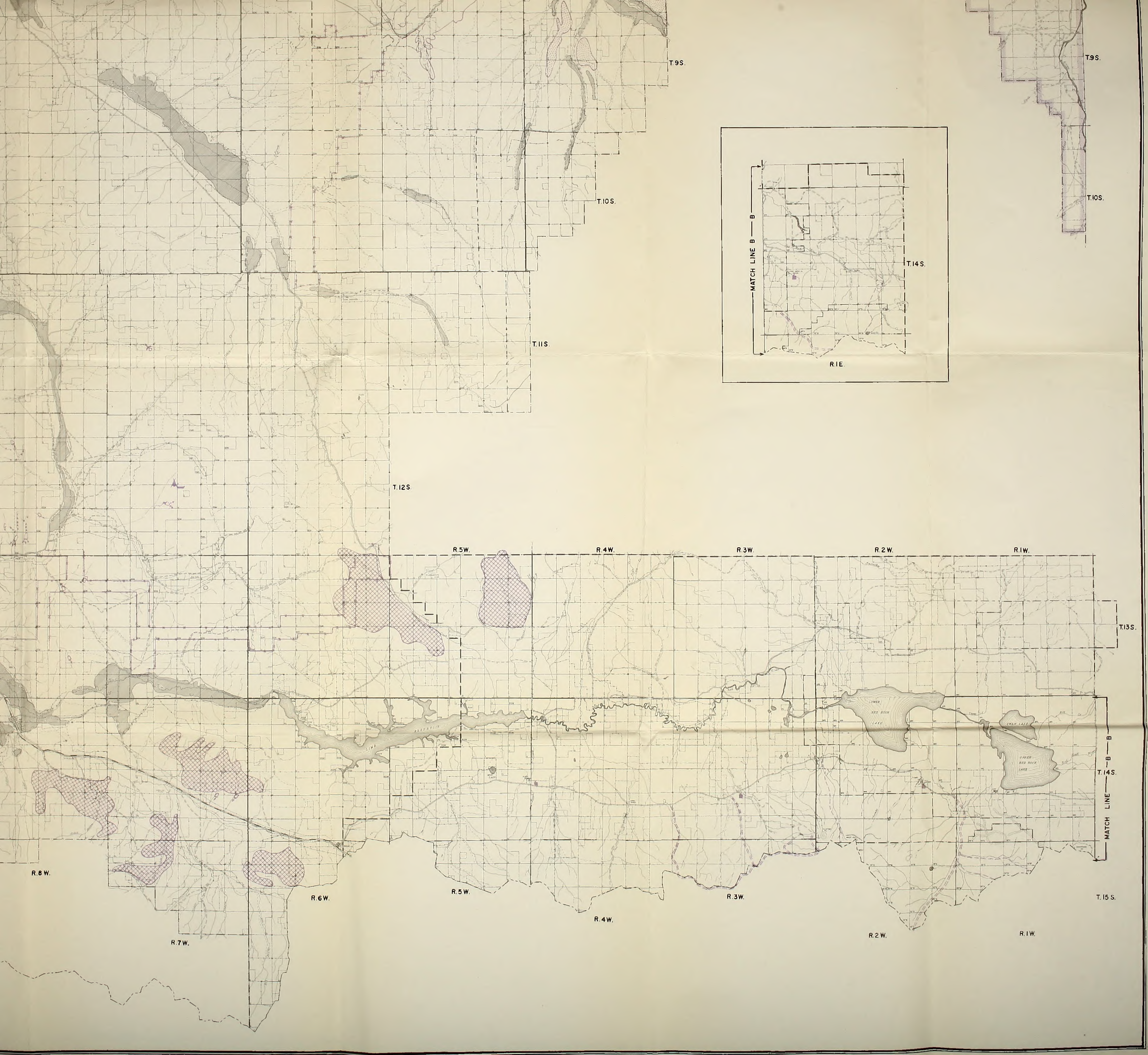
PROPOSED LAND USE AND IMPROVEMENT MAP

SHEET No. 1 of 2




R.8W.
R.7W.
R.6W.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.
T.3S.
T.4S.
T.5S.
T.6S.
T.7S.
T.8S.
T.9S.
T.8S.
T.9S.
ISOLATED
TRACT
CLASSIFICATION
ENNIS LAKE
REDUCE
STOCKING
50%


T.9S.
MATCH LINE — A
T.10S.
REDUCE STOCKING 75%
REDUCE STOCKING 50%
T.11S.
R.14W.
R.13W.
T.12S.
T.13S.
T.14S.
T.15S.
R.12W.
R.11W.
R.10W.
REDUCE STOCKING 50%
REDUCE STOCKING 75%
R.9W.
R.8W.
R.7W.
MATCH LINE — A — A
T.10S.
R.15W.


T.9S.
T.9S.
T.10S.
T.10S.
T.11S.
T.12S.
T.13S.
T.14S.
T.14S.
T.15S.
MATCH LINE B — B
R.1E.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.
LIMA RESERVOIR
LOWER RED ROCK LAKE
SWAN LAKE
UPPER RED ROCK LAKE
MATCH LINE B — B
R.8W.
R.7W.
R.6W.
R.5W.
R.4W.
R.3W.
R.2W.
R.1W.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
AREA 3

UPPER MISSOURI RIVER BASIN MAP

MONTANA
SHOWING

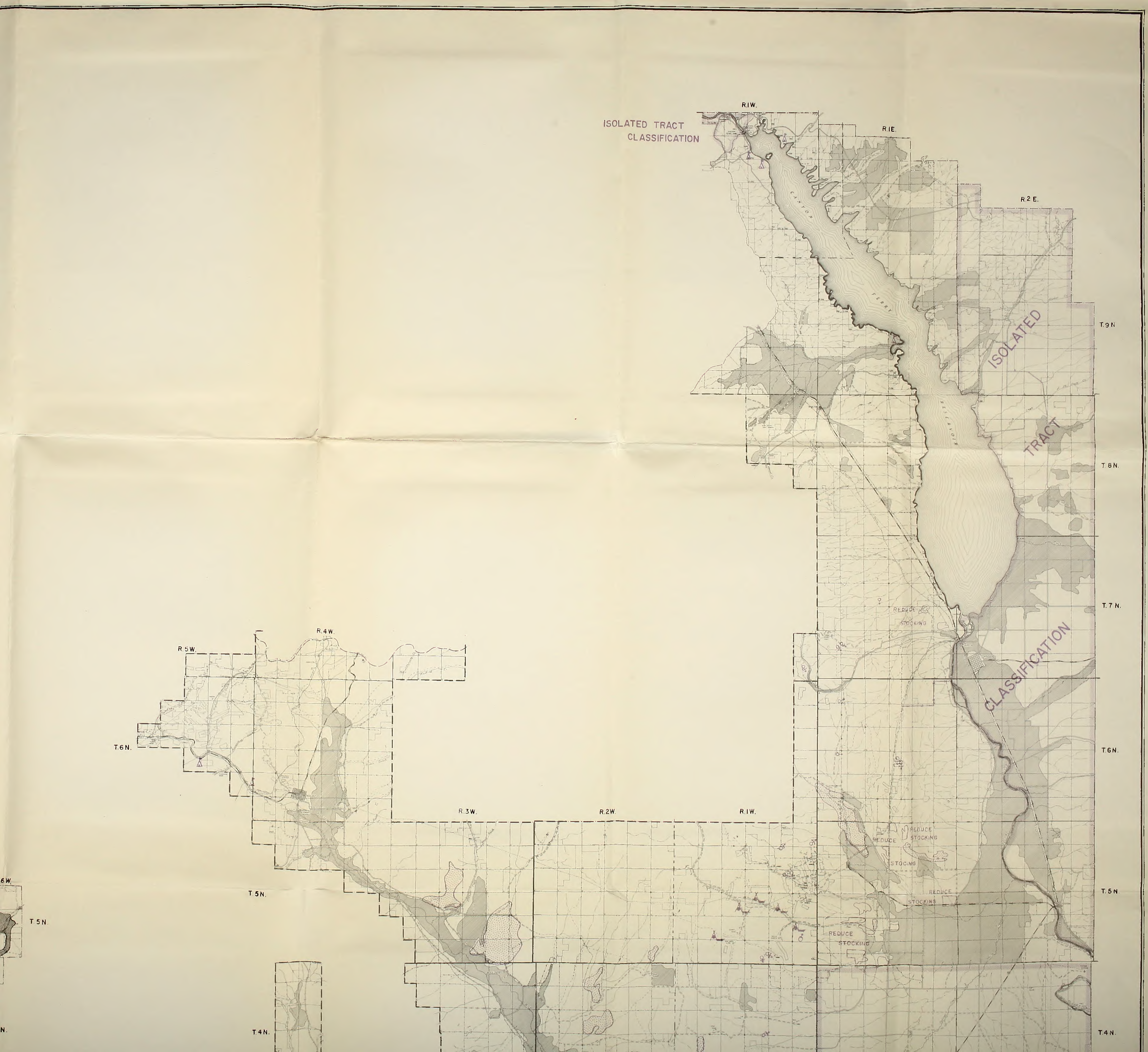
PROPOSED LAND USE AND IMPROVEMENT MAP

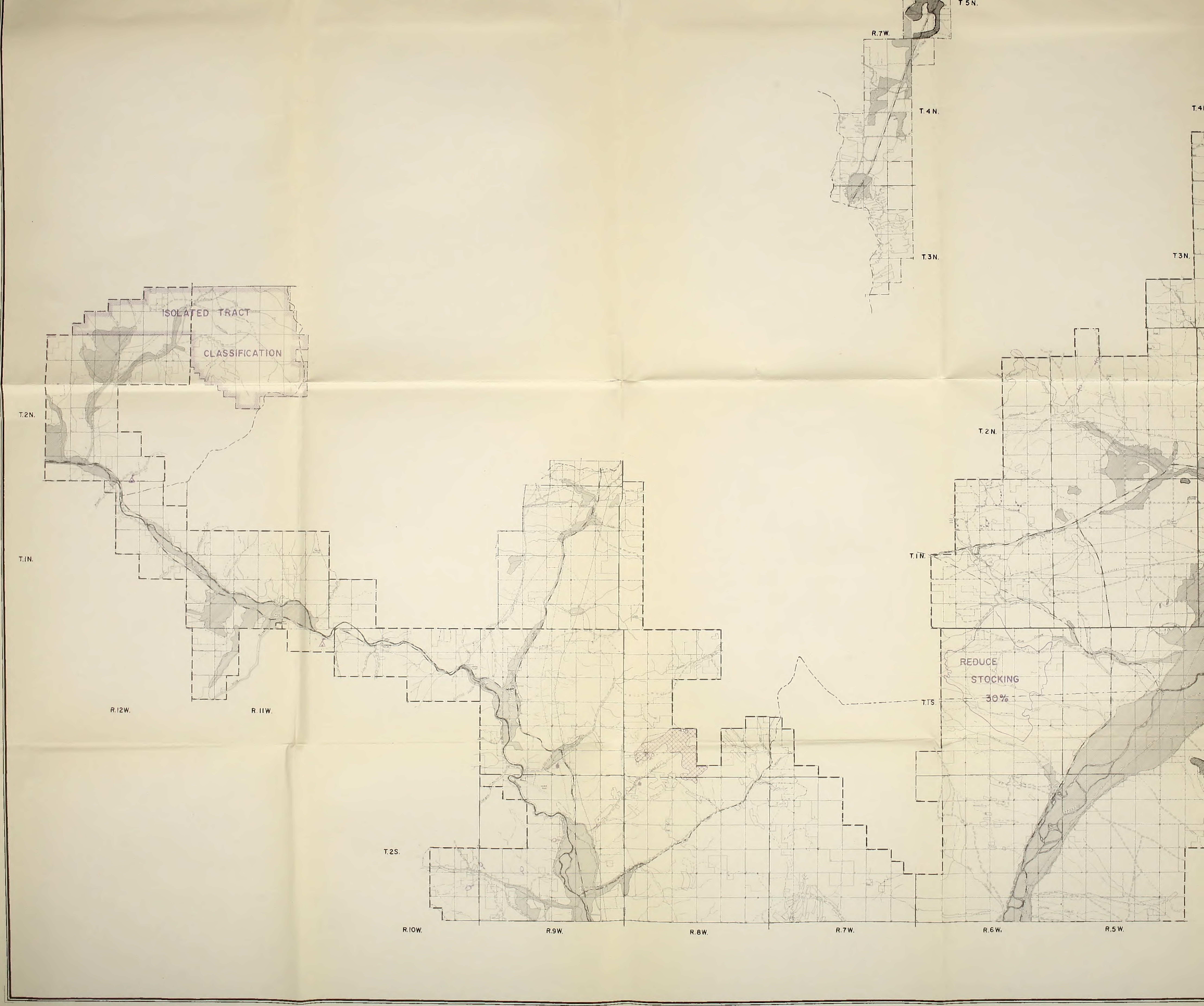
SHEET No. 2 of 2

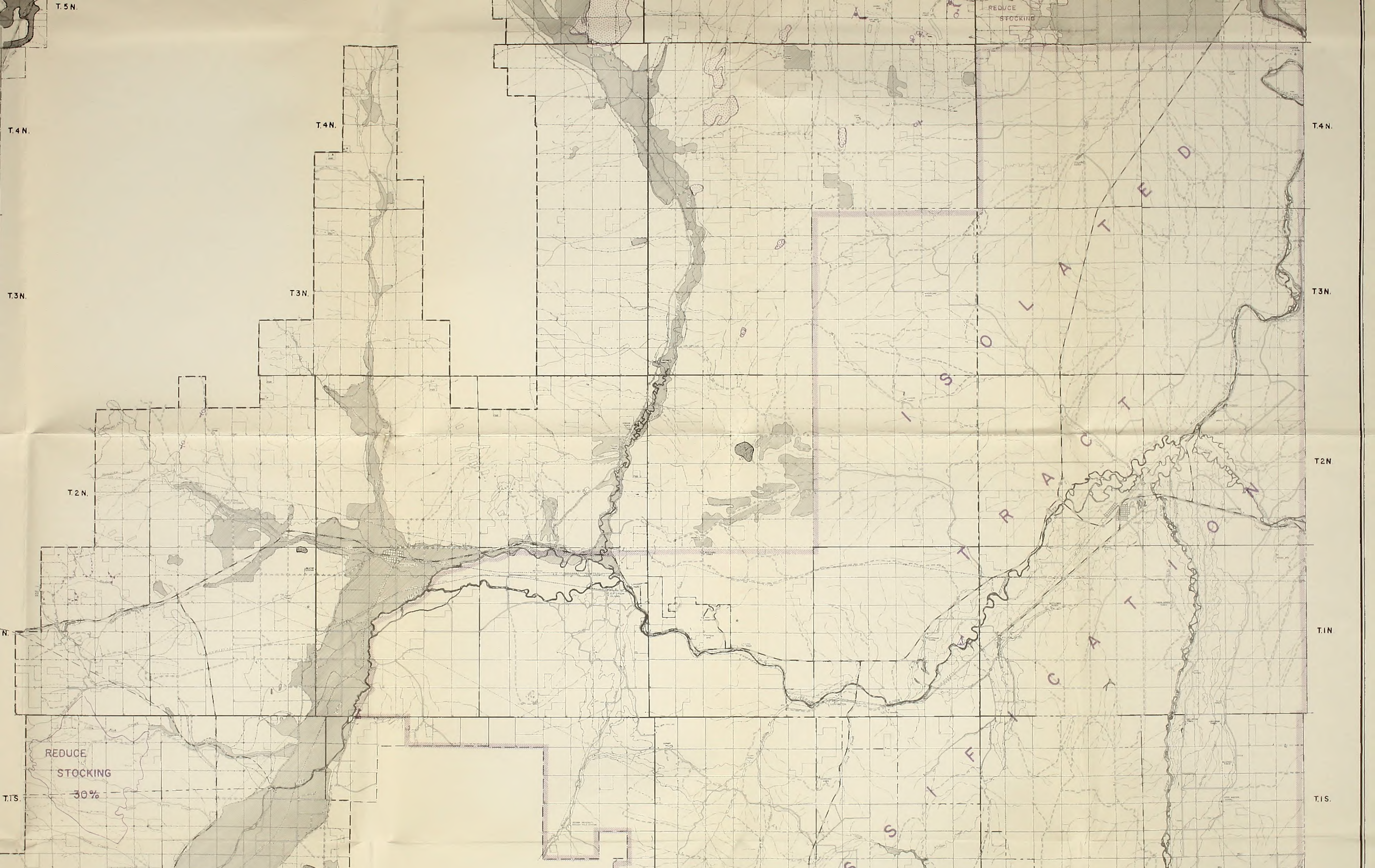
1 0 1 2 3 4 5
SCALE IN MILES
JUNE 1954

LEGEND

▭	Reduce Stocking
▨	Rodent Control
▤	Waterspreading-Dikes
▤	Waterspreading-Contour-Furrows
▩	Sagebrush Eradication
▒	Reseeding
▩	Poison Plant Eradication
═╫═╫═	Road Bar
- - - - -	Trail
= = = = =	Dirt Road
—x—x—x—	Fence
◁	Reservoir
⋏	Windmill with Trough
○→	Spring
○⊢	Spring with Trough
---→/	Check Dam or Gully Plug
⋘	Detention Dam
■	Fire Tool Cache
△	Recreation and Campground
▬	Boundary of Isolated Tract Classification


ISOLATED TRACT
CLASSIFICATION
R.1W.
R.1E.
R.2E.
CANYON
FERRY
RESERVOIR
ISOLATED
TRACT
CLASSIFICATION
T.9N.
T.8N.
T.7N.
T.6N.
T.5N.
T.4N.
REDUCE
STOCKING
REDUCE
STOCKING
REDUCE
STOCKING
STOCKING
REDUCE
STOCKING
REDUCE
STOCKING
R.5W.
R.4W.
T.6N.
R.3W.
R.2W.
R.1W.
T.5N.
T.4N.
6W.
T 5N.
N.


T.5N.
R.7W.
T.4N.
T.4
T.3N.
T.3N.
ISOLATED TRACT
CLASSIFICATION
T.2N.
T.2N.
T.1N.
T.1N.
REDUCE
STOCKING
30%
T.1S
R.12W.
R.11W.
T.2S.
R.10W.
R.9W.
R.8W.
R.7W.
R.6W.
R.5W.


T.5N.
REDUCE
STOCKING
T.4N.
T.4N.
T.4N.
T.3N.
T.3N.
T.3N.
T.2N.
T.2N
N.
T.1N
T.1S.
T.1S.
T.2S.
REDUCE
STOCKING
30%
ISOLATED TRACT CLASSIFICATION
R.6W.
R.5W.
R.4W.
R.3W.
R.2W
R.1W.
R.1E.
R.2E.

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